CHNOLOGY DEPT.

MAY 1950

The Paper Industry

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100% Stable • 100% Available

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"Machine tenders report much better sheet formation with Nalco 680, and that jordans can be cut back 10 amps. Machines are cleaner with no deposits on cylinders."

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"Results using Nalco 680 at the rate of five pounds per ton have been good. Improved sizing and reduced alum from 250 to 140 pounds per 4500 pounds of furnish. This enabled the mill to meet rigid pH specifications for the paper."

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Nalco SYSTEM ... **Serving the Paper Industry through Practical Applied Science**

THE FUTURE OF YOUR PRODUCT IS IN THESE HANDS

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THE RESINOUS PRODUCTS DIVISION

Washington Square Philadelphia 5, Pa.

The Resinous Products Division was formerly The Resinous Products & Chemical Company

OTHER CHEMICALS FOR THE PAPER INDUSTRY

RHOZYMES BB and E-5—for enzyme conversion of starch.

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TRITONS—Surface-active agents with a score of uses in paper manufacture—in caustic cooking of cotton fiber, as a dispersing agent for pigments and metallic soaps, emulsion-type coatings.

The Hydrosulfites—Reducing agents for stripping color from rag stock or for bleaching pulp.

HYAMINES—Deodorants for paperboard and glue bactericides.

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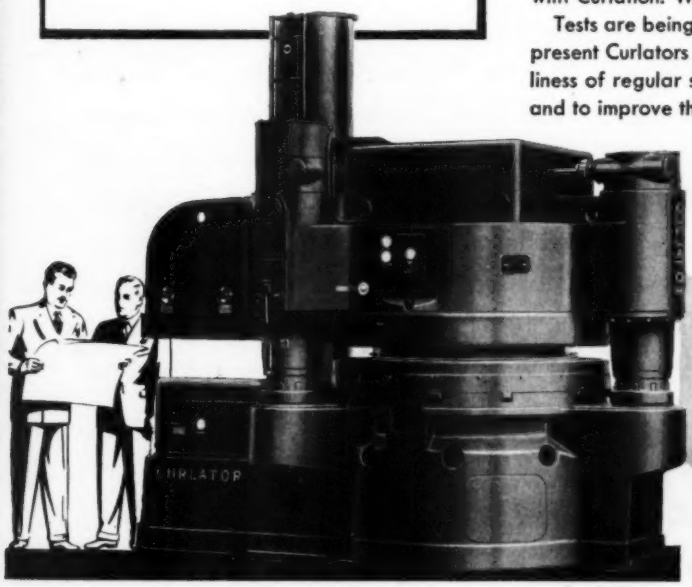
CURLATION MAY BE ABLE TO *Save* 10% OF YOUR WOOD

Yes, Curlation may be able to save 10% of your wood, if you operate an unbleached sulphite mill. Curlators now in commercial operation on newsprint sulphite are making possible the manufacture of sulphite pulp of equal quality to that previously produced, with a saving of 10% in wood plus substantial savings in coal, limestone and sulphur. You, too, may be able to cut costs with Curlation. Why not investigate?

Tests are being conducted on new applications of Curlation. At present Curlators are being used effectively to improve the cleanliness of regular sulphite, to increase the yield of news sulphite, and to improve the bending qualities of folding boxboard liner.

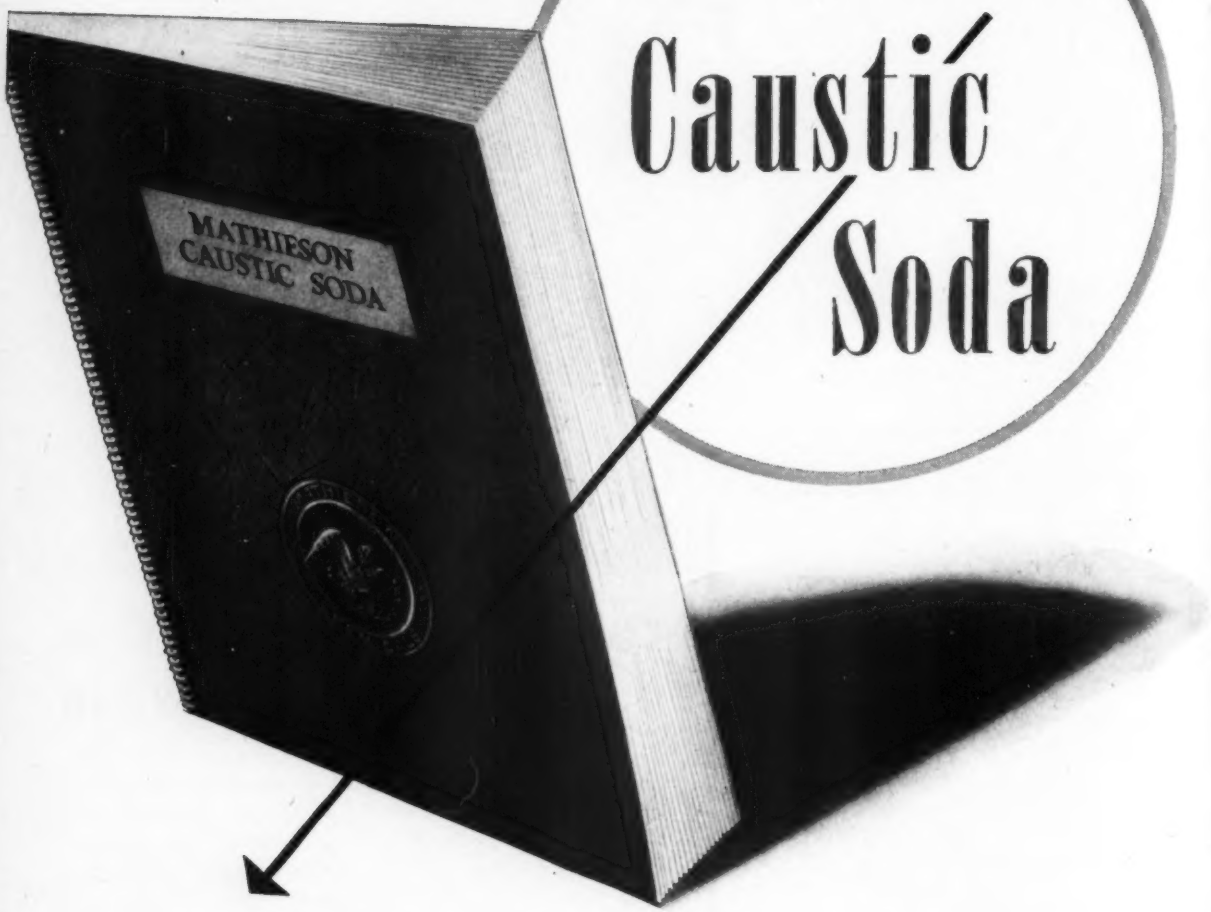


WRITE for new bulletin C-2 on the C-50 CURLATOR. Inquiries are invited.

CURLATOR†
Corporation
565 BLOSSOM ROAD · ROCHESTER 10, NEW YORK

†T. M. Reg.—Curlator Corporation, Rochester, N. Y.

for users of Caustic Soda



• This completely new 48-page book entitled "Mathieson Caustic Soda" is now available to users throughout industry. Fully illustrated, it covers in detail the manufacture, economics, properties, handling and sampling of this product.

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The Paper Industry

Technology • Engineering • Management • Production

VOLUME 32 • NUMBER 2 • MAY, 1950

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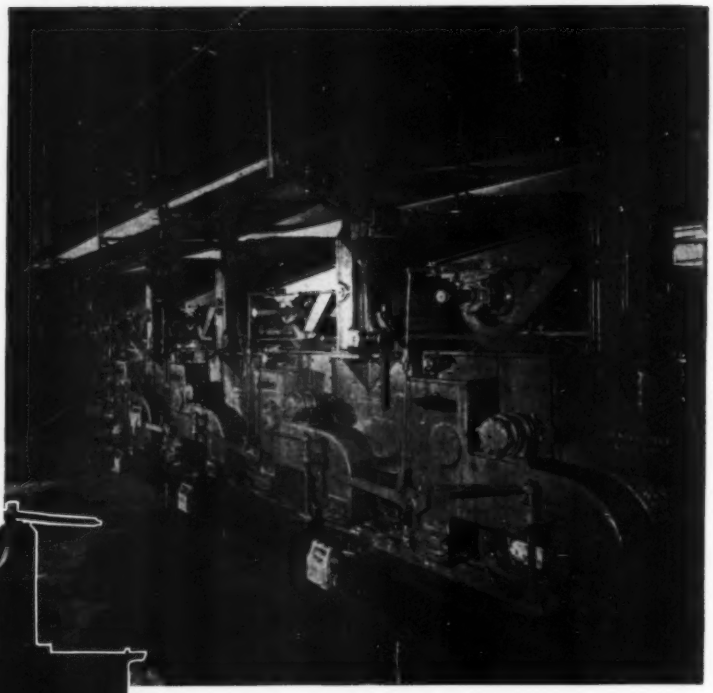

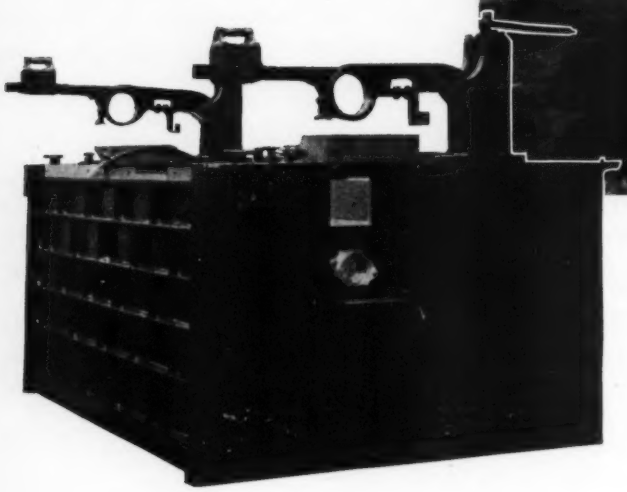

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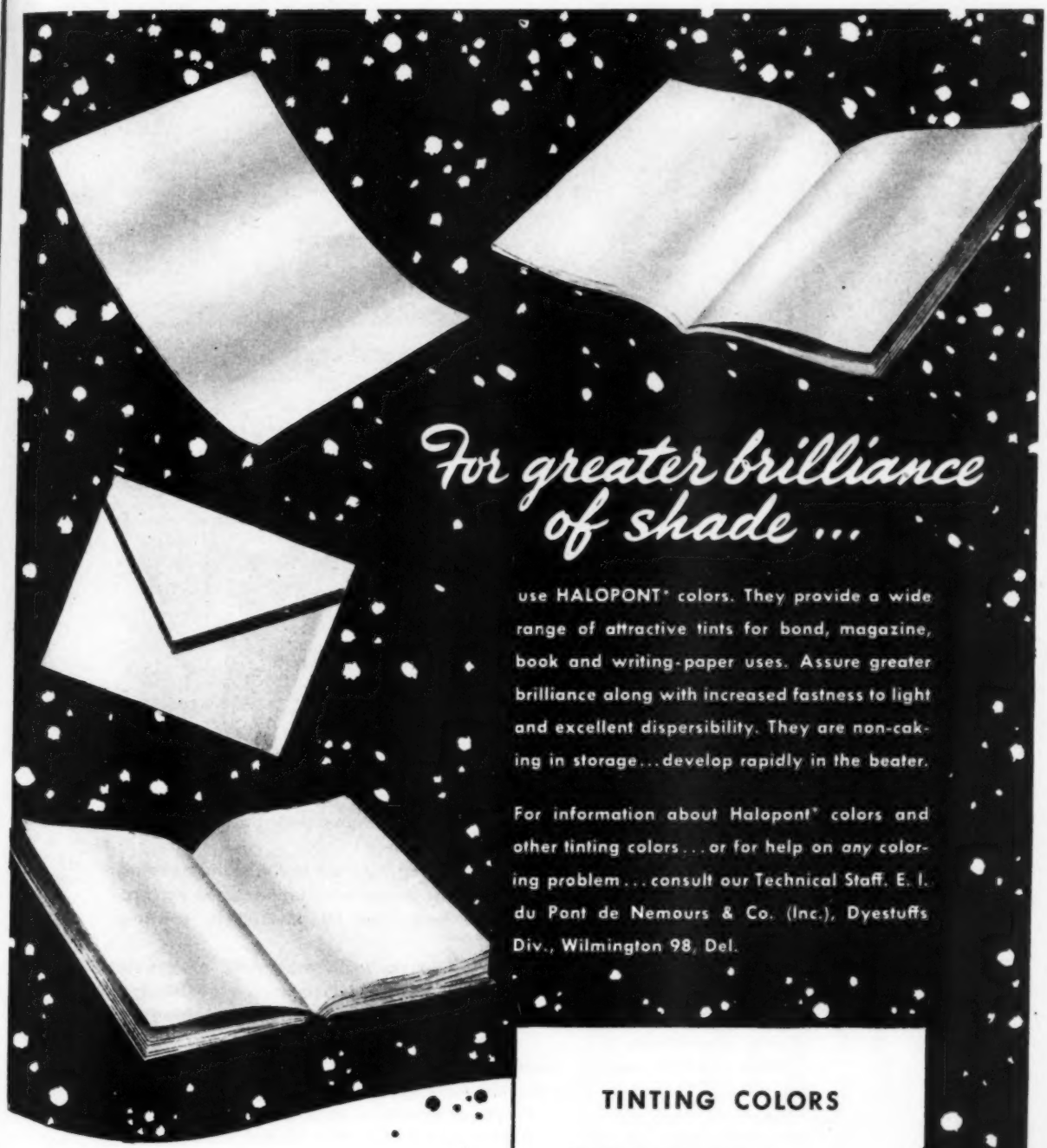

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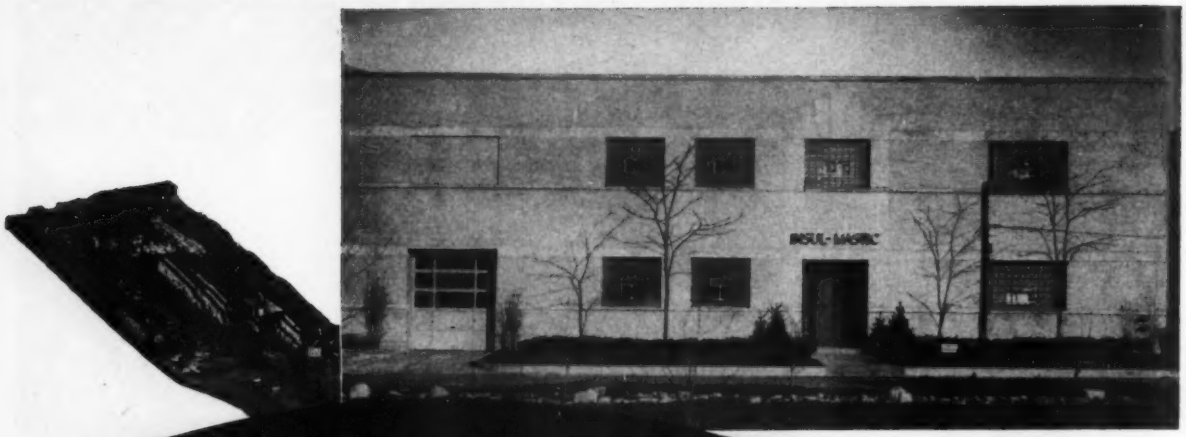
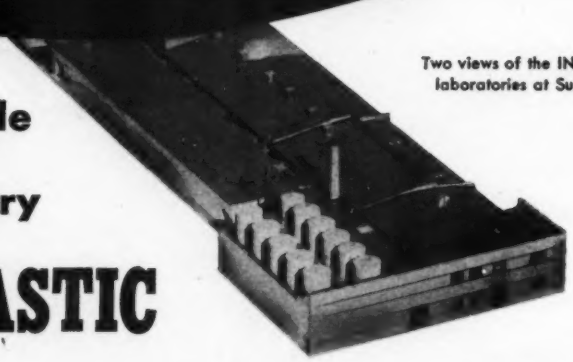


from these laboratories



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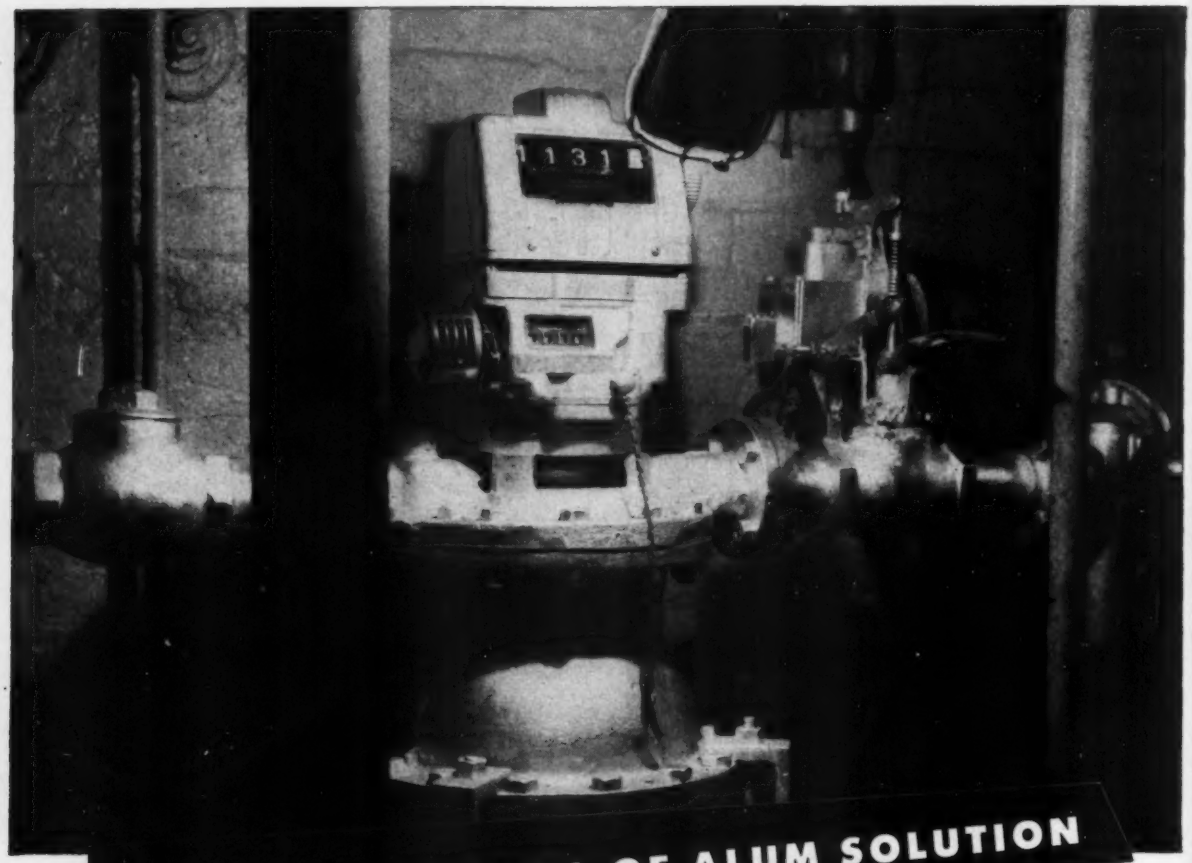

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. . . is an important step toward consistent uniformity of paper.

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Every twenty-four hours 6,500 gallons of liquid alum are accurately and conveniently measured into the beaters and evenly distributed throughout the mixture.

*Name on request

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LIQUID CONTROL SPECIALISTS SINCE 1885

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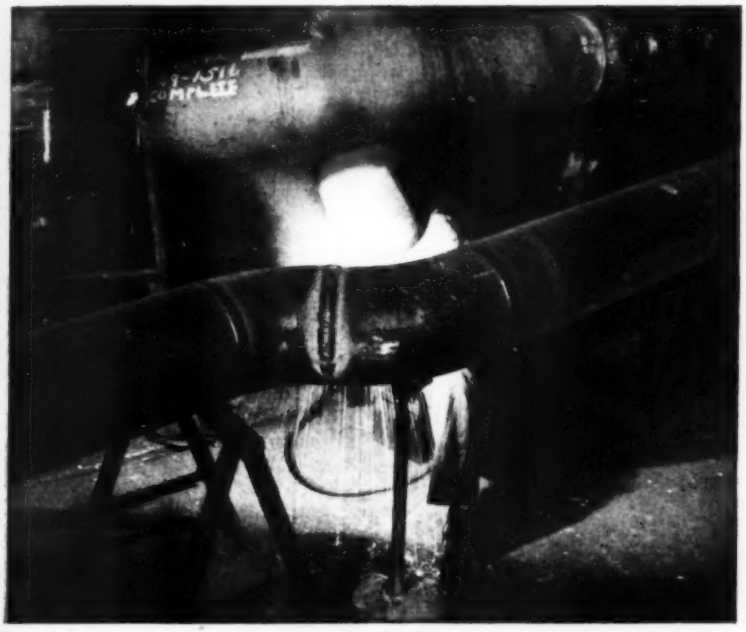
how to GET MORE WELDING from your PIPE WELDERS



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Metallurgical advancements permit Yarway Digester Valves to withstand the high pressure, shock and chemical action always encountered in this rigorous service.

In one mill, Yarway Valves increased production 1½ to 2 cooks a day. Another reports maintenance is lower than on any other type. The Motor Control on these valves is so simple, anyone can operate them.

For more information on these production-boosting digester valves, write . . .

YARNALL-WARING COMPANY
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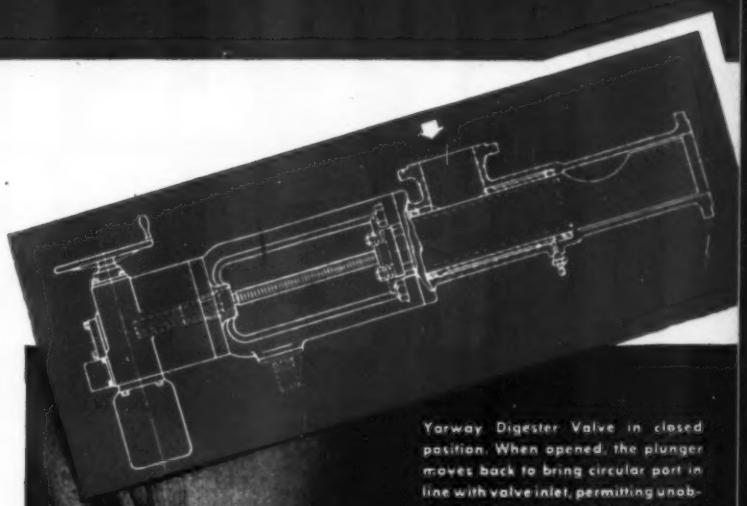
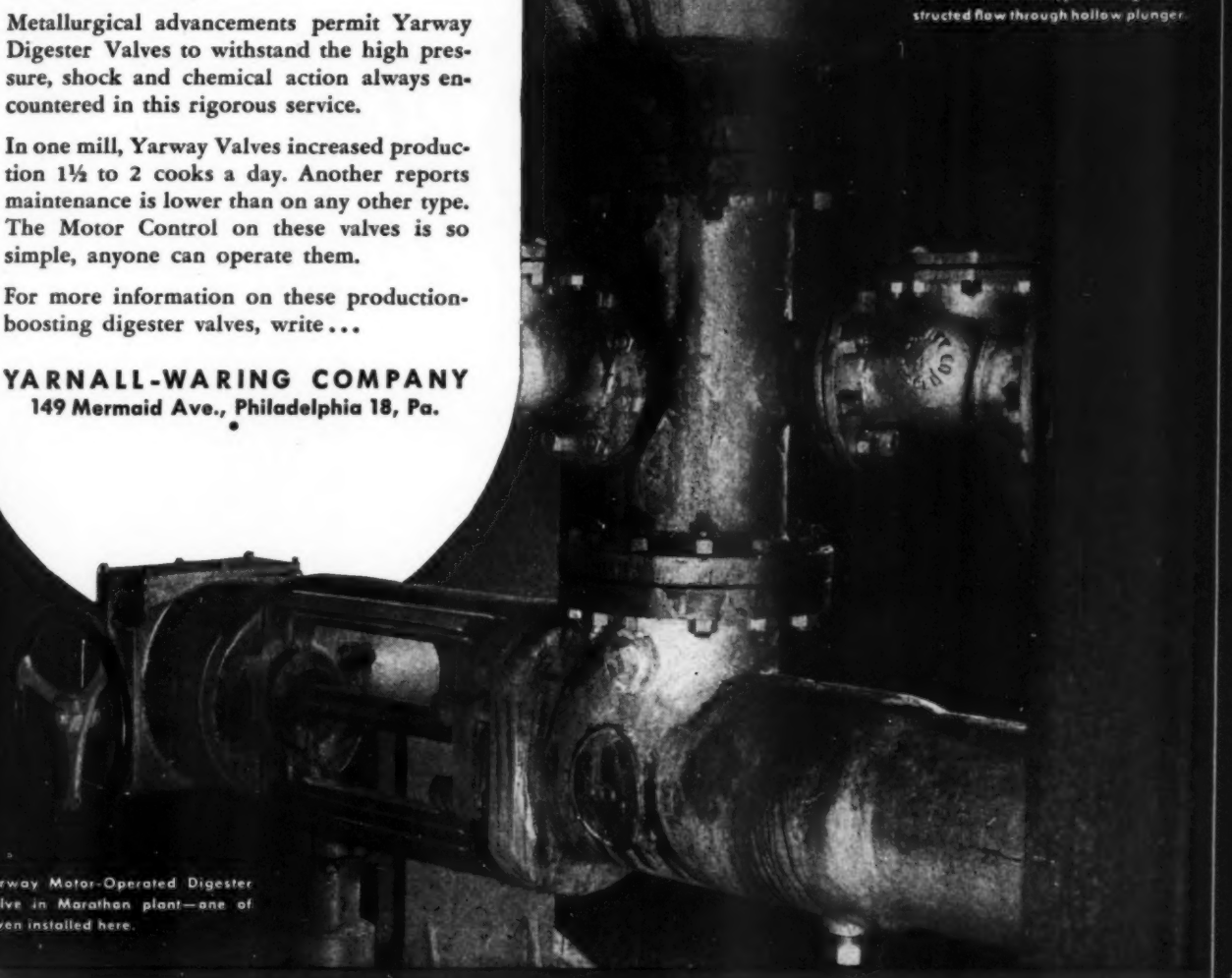


Yarway Digester Valve in closed position. When opened, the plunger moves back to bring circular port in line with valve inlet, permitting unobstructed flow through hollow plunger.



Yarway Motor-Operated Digester Valve in Marathon plant—one of seven installed here.

YARWAY BLOW-OFF VALVES

APPLETON FELTS

for Dependability

APPLETON WOOLEN MILLS

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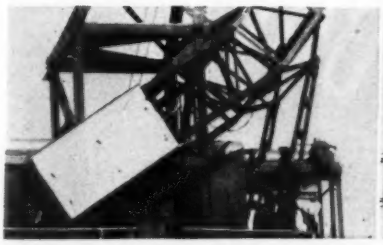
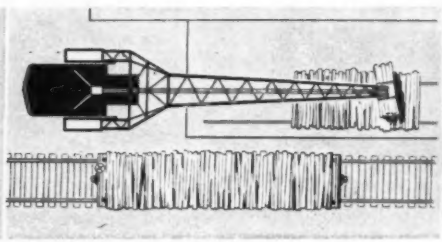
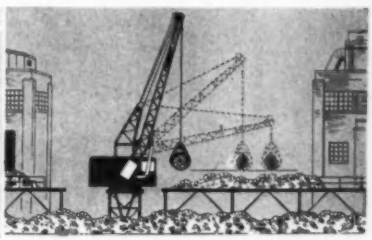


COUNTERWEIGHTED BOOM. To raise or lower boom, only enough power to overcome inertia is needed. You "travel" and "spot" the load by this free booming action alone!



IN CLOSE QUARTERS, the use of a crane involves up-and-down boom action. The American Pulpwood Crane can provide this accurate spotting with *absolute safety.*



RAPID BOOM ACTION swings boom through its full arc in 15 seconds. *Boom cannot be dropped, over-raised or over-lowered.* It reverses automatically at end of arc.

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St. Paul 1, Minnesota

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Company _____

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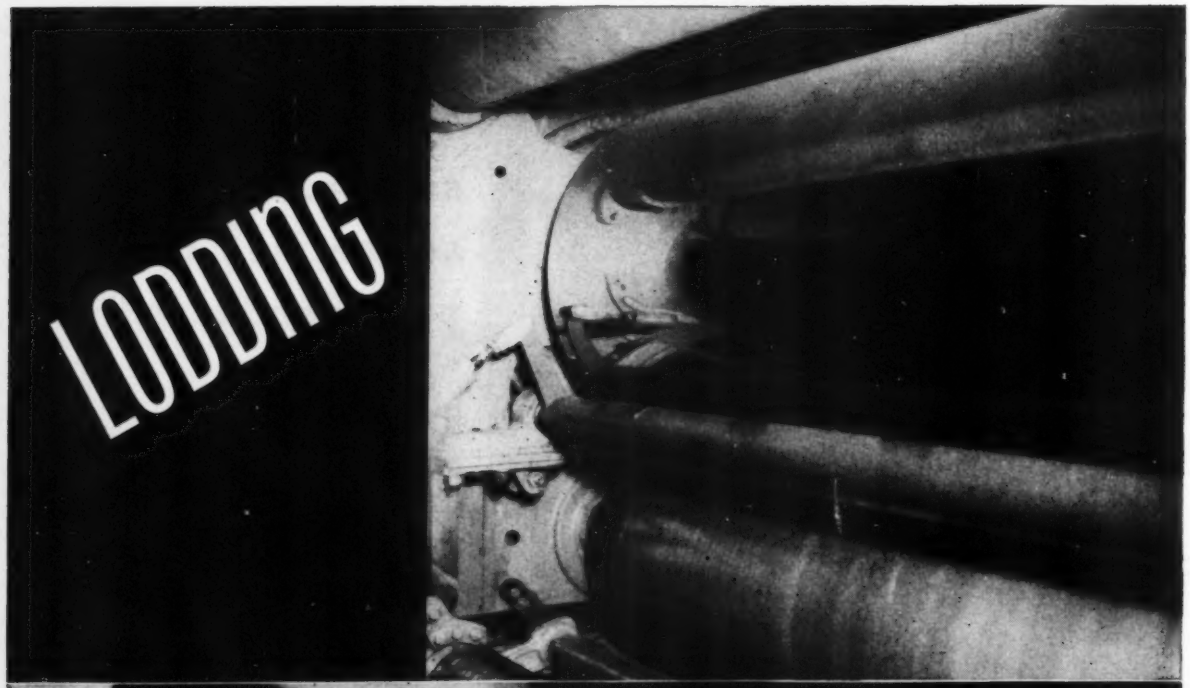

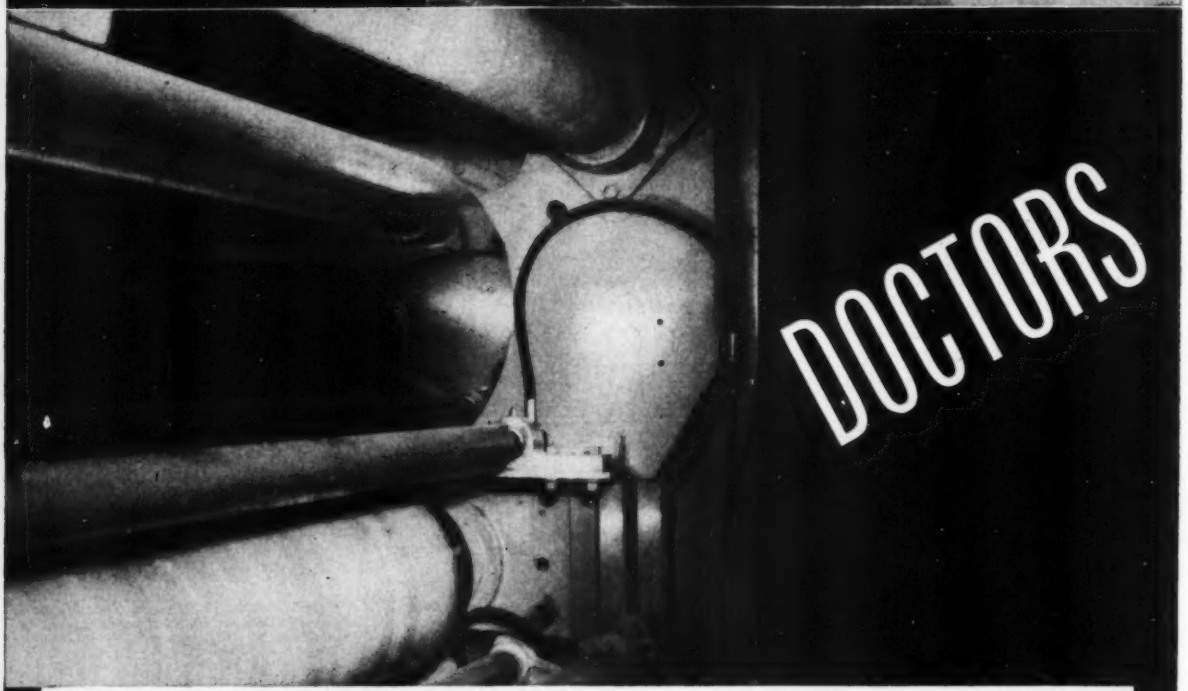

Reflecting the quality of
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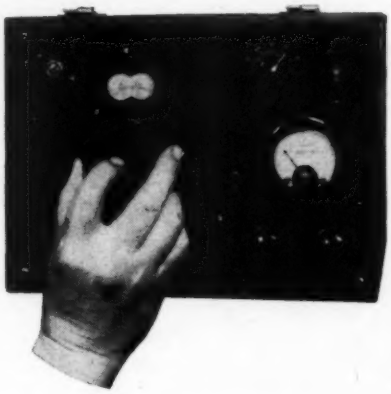

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- Nitric Acid
- Sodium Bisulfite (Anhydrous)
- Sodium Fluoride
- Sodium Thiosulfate (Hypo)
- Sodium Metasilicate
- Sodium Silicate
- Sodium Sulfide
- Sulfuric Acid
- Tetrasodium Pyrophosphate (Anhy.)
- Trisodium Phosphate
- Copper Sulfate
- Sodium Sulfite (Anhydrous)

ALUMINUM SULFATE

Standard: Lump; Ground, 99% thru 8 mesh, 95% thru 10 mesh; Powdered, 95% thru 100 mesh. Liquid, 32° Bé.
Iron Free: Lump, approx. 2 ½", Ground thru 8 mesh. Liquid, 32° Bé.

SODIUM SULFATE

(Salt Cake) Paper Makers' Grade, thru 8 mesh, 95%-99% Na_2SO_4.

BASIC CHEMICALS

GC

FOR AMERICAN INDUSTRY

51 YEARS OF SERVICE

GENERAL CHEMICAL DIVISION

ALLIED CHEMICAL & DYE CORPORATION

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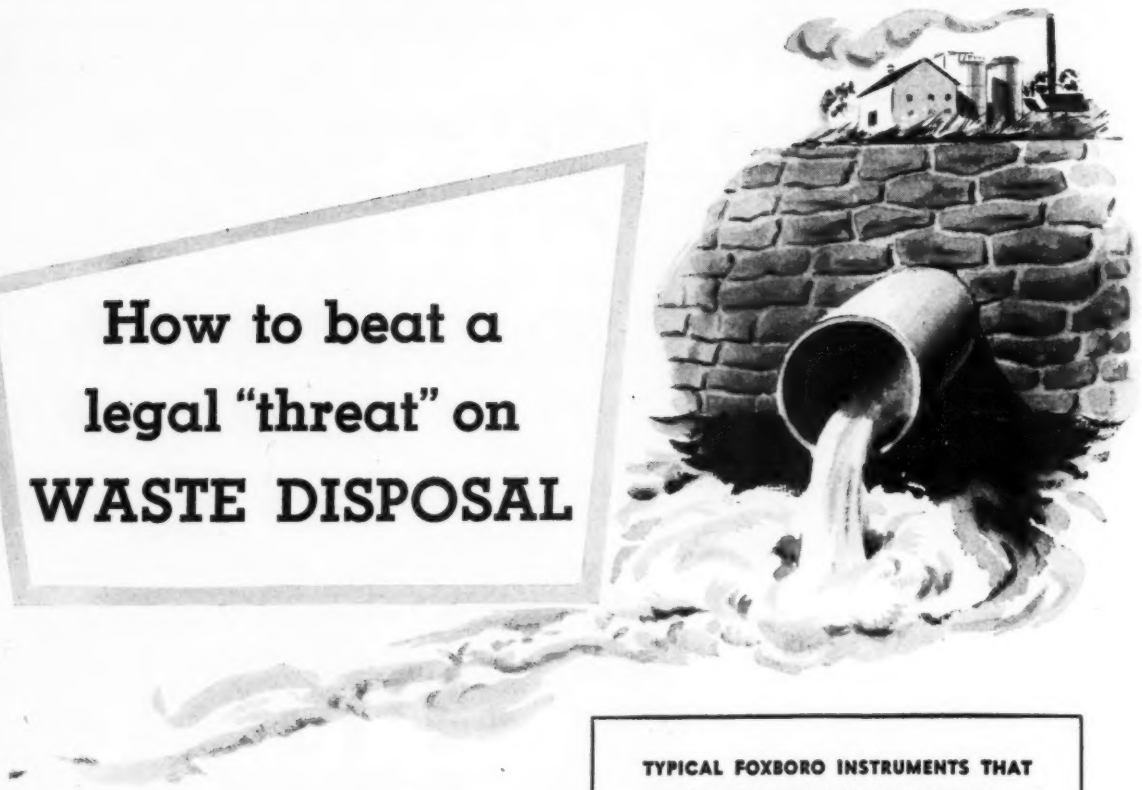
How to beat a legal "threat" on WASTE DISPOSAL



. . . and cut fibre and chemical losses!

WITH STATE AFTER STATE now imposing legal restrictions on industrial waste disposal, you may be faced with this problem quite suddenly. Only by starting to gather complete data now can you be prepared for necessary action when that time comes. And the same data will reveal the extent of your fibre and chemical losses in plant waste. (The Foxboro waste-sampling system gives a continuous sample always in proportion to effluent rate—thereby assuring an accurate analysis.)

Foxboro has prepared a concise, informative bulletin on how to conduct a waste disposal survey. Based on specialized knowledge and long experience, this bulletin outlines the simple steps you can take to avoid hasty, last-minute plans. It shows how a careful, unhurried survey now can easily provide the facts on day-to-day quantities, concentrations, and constituents, so essential to efficient planning.

Send for a copy of "Waste Disposal Surveys". Write **The Foxboro Company 158 Neponset Ave., Foxboro, Mass., U. S. A.**

TYPICAL FOXBORO INSTRUMENTS THAT LEAD TO BETTER WASTE DISPOSAL

The Model 40 . . . "The finest modern controller" . . . is the foundation of many outstanding Foxboro Waste Disposal Systems. It is used for the control of flow, pH, conductivity, temperature and other variables. Thousands are in use daily.

Foxboro Float and Cable Type Instruments are specifically designed for use on weirs and Parshall flumes. They read directly in *flow*.

FOXBORO REG. U. S. PAT. OFF.

RECORDING · CONTROLLING · INDICATING INSTRUMENTS

For Peak Production use LINK-BELT SILENT CHAIN DRIVES

Easy to Select...

Easy to Install...

Immediate Delivery!

Full output at rated capacity demands power transmission without slippage—such as Link-Belt Silverstreak silent chain drives have always provided. Every r.p.m. is transmitted to the driven machine. Losses due to slippage are eliminated—output is increased. Yet Link-Belt Silverstreak silent chain possesses sufficient flexibility to absorb shock. Even on short centers it runs slack with minimum wear. Moisture, temperature, age or periods of idleness have no effect on these all-steel, precision-built drives, immediately available from stock in ½ to 50 h.p. sizes. Stock Drive book No. 2125-A speeds and simplifies the selection of chains and sprockets to provide the exact drive required for any application in this horsepower range. Send for a copy, at once.

LINK-BELT

Silverstreak

SILENT CHAIN DRIVES

4 New Features of LINK-BELT Pre-selected Stock Silent Chain Drives

1 TAPER-LOCK BUSHINGS
Easy on—easy off—no reboring necessary.

2 PINIONS-HARDENED TEETH
All-steel, with hardened teeth. Finished bores and keyways for N. E. M. A. motor shaft sizes.

3 INTERCHANGEABILITY
Link-Belt stock silent chain and Link-Belt stock silent chain sprockets are interchangeable with silent chain sprockets and silent chains cut to same tooth form.

4 EASY SELECTION
Easy-to-use selection tables cover ½ to 50 h.p. stock drives, tailored for normal operating conditions.

LINK-BELT COMPANY 11,808

Indianapolis 6, Chicago 9, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices, Factory Branch Stores and Distributors in Principal Cities.

31st Annual

SUPERINTENDENTS CONVENTION

Edgewater Beach Hotel, Chicago, Ill.

June 8-9-10, 1950

TENTATIVE PROGRAM

Wednesday, June 7

9:30 A.M. Registration for Plant visits
J. L. Kubicka in charge
I. S. Berlin Press . . . W. F. Hall Printing Co. . . . Newman-Rudolph Lithographing Co. . . . Sinclair & Valentine Co.

11:00 A.M. Convention Registration

1: P.M. Golf Tournament, Nordic Hills Country Club, Itasca, Ill.

2:00 P.M. Plant visits

7:00 P.M. Affiliates Dinner.

Thursday, June 8

9:30 A.M. Business Meeting, Charles H. Reese presiding.

10:30 A.M. General Conference, Charles H. Reese presiding.

Our Civic Responsibility . . . How the U.S. Weather Bureau Can Save Money for Paper Mills . . . Teamwork Today.

12:30 P.M. Luncheon at your pleasure.

2:00 P.M. Group Meetings.

Wood Room and Woods Operations, Mace Harris, Chairman

Wood Deterioration in Storage . . . Portable Chipper in Woods Operations . . . Other papers in process of development.

Coated Papers, E. T. A. Coughlin, Chairman

High-Grade Offset Papers . . . Some Phases of Wide-Roll High-Speed Supercalenders . . . Paper Coating on the Fourdrinier and Press Section . . . Improved Pick Tester . . . Experiences with Development of Coated Board . . . Some Economic Aspects of Machine Coating . . . High-Speed Air Jet Coaters . . . Machine Coating of Board on the West Coast . . . Machine Coating in Scotland, England, Norway, and Italy.

Power, Grover Keeth, Chairman

Gas Turbines . . . Resuscitation from Electric Shock . . . What We Have Learn About Diesel Engines.

7:00 P.M. Dinner at your pleasure.

Friday, June 9

9:30 A.M. Group Meetings

Fine Paper and Tissue, F. L. Zellers, Chairman

Art of Visual Color Matching of Paper . . . Filtration and Papermaking . . . Subject Relating to Tissues.

Sulphite, R. L. Davis, Chairman

Semi-Chemical Pulping . . . Other papers in process of development.

Board, Glen Sutton, Chairman

Common Faults of Paperboard and Their Correction . . . Variables of Papermaking and Their Remedies . . . Complete Control from Raw Stock to Finished Paper . . . Effect of Fiber Size Distribution on the Properties of Hardboards made from Fiberized Water-Soaked Douglas Fir Chips . . . Question and Answer period.

12:30 P.M. Luncheon at your pleasure

2:30 P.M. Group Meetings

Kraft, G. K. Singletary, Chairman

The Development of the Hydraclone for the Paper and Pulp Industry . . . Stream and Air Pollution of the Pulp and Paper Industry . . . Alkaline Semi-Chemical Pulping.

Mill Maintenance, Martin J. Auchter, Chairman

Ultra-High Speed Motion Picture Camera in Paper Mill Maintenance . . . Mill Painting and Its Relation to Mill Maintenance . . . Anti-friction Bearing Failures on Dryers—Panel Session.

Graphic Arts, J. L. Kubicka, Chairman

Beautiful vs. Successful Design . . . Is It Always the Paper? . . . A New Approach to Smoothness Measurement . . . Limitations of Ink Adjustments to Paper.

6:00 P.M. Get-Together Party

7:00 P.M. Banquet

10:00 P.M. Dance

Saturday, June 10

9:30 A.M. General Conference, Herbert T. Randall, Moderator

Theme: The Pulp and Paper Mill Superintendent—An Appraisal . . . What a Superintendent Should Know Concerning Management . . . The Superintendent and the Engineering Department . . . The Superintendent's Function in Research and Technical Control . . . The Part Played by a Superintendent in Personnel Relations.

12:30 P.M. Joint Luncheon
Some Hopeful Experiments in Industrial and Community Relations.

Ladies Program

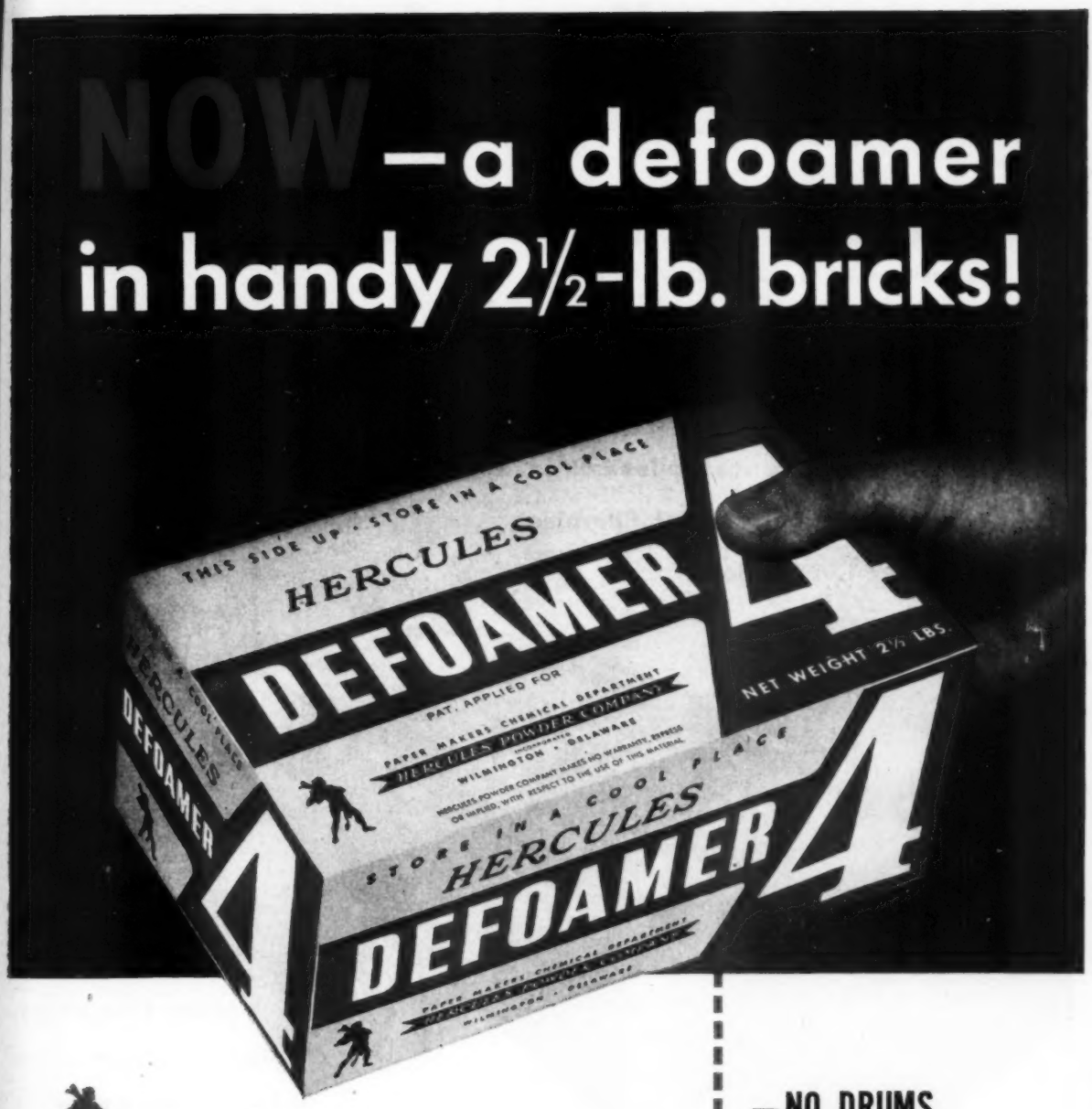
Sight-seeing and field trip to Museum of Science and Industry . . . Luncheon and Style Show, Carson, Pirie, Scott & Co.

The American Pulp and Paper Mill Superintendents Association, Inc.

220 East 42nd Street
New York 17, N. Y.

111 W. Washington St.
Chicago 2, Illinois

NOW—a defoamer in handy 2½-lb. bricks!



Now you can buy your defoamer in easy-to-handle, easy-to-use bricks! No waste! No mess! No heavy drums to handle or ship back! Bricks quickly dissolve in water. One 2½-lb. brick of Defoamer 4* makes 40 gallons. Try this new, low-cost Hercules product today at our expense, and be convinced of its convenience and economy. Send for free sample brick.

HERCULES POWDER COMPANY 961 King St., Wilmington 99, Delaware

HERCULES

SIZING MATERIALS AND CHEMICALS FOR PAPER

—NO DRUMS TO HANDLE

—EASY TO USE, EASY TO STORE

—ONE BRICK MAKES 40 GALLONS

—FREE SAMPLE BRICK ON REQUEST

*PAT. APPLIED FOR

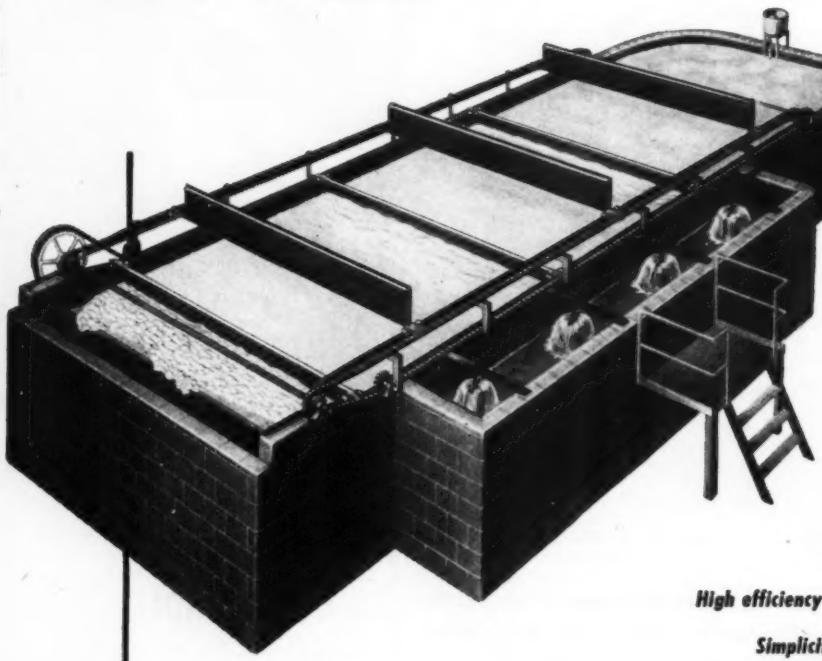
PP50-3

no stream pollution here!

SVEEN PEDERSEN
FLOTATION
SAVEALL

Clarifies water to such an extent that effluent contains less than two-tenths of a pound of filterable solids per 1,000 gallons.

One of the outlet tube discharges



OTHER ADVANTAGES:

Rapid return of recovered fibers.

Clarified water usable in many places.

High efficiency on free, slow, or filled stock furnishes.

Simplicity in cleaning due to open construction.

Low maintenance costs—no screens, few moving parts.

Relative insensitivity to fluctuation in quantity of incoming white water.

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295 MADISON AVENUE, NEW YORK 17, N. Y.

In Canada: **ALEXANDER FLECK, LIMITED**
416 WELLINGTON STREET, OTTAWA, ONTARIO

HIGHER TEMPERATURES · HIGHER PRESSURES

SIZE-FOR-SIZE, *AT NO EXTRA COST*

OIC SETS THE PACE IN VALVES

New FORGED STEEL VALVE

Here's the answer to your toughest pressure-temperature problems! It's the brand-new OIC Figure 1221, designed to take *higher* pressures, higher temperatures, tougher all-around operating conditions — with *no* increase in cost over its most popular competitors. It gives you a bonus of safety on your standard applications, and you needn't "step up" to more expensive valves to meet extra-high job ratings. You can *standardize* on the complete OIC forged steel line. You're in for a pleasant surprise when you check specifications of the new forged steel series, so don't wait. Call your nearest OIC distributor. *See this valve now!*

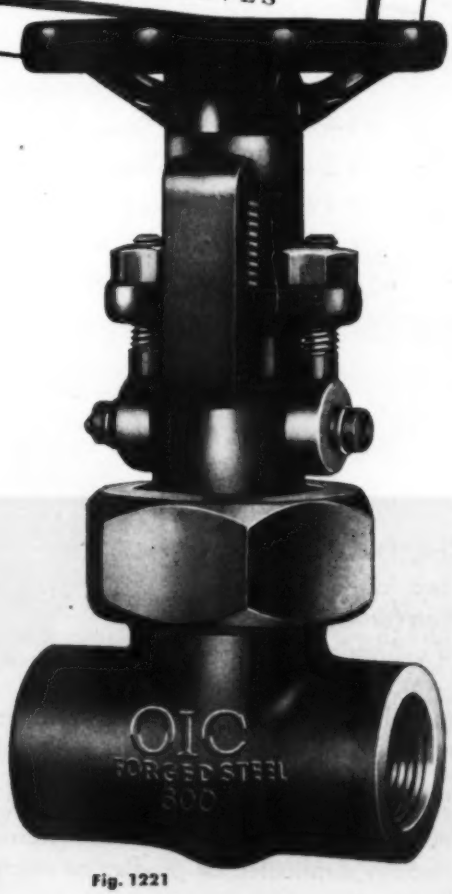


Fig. 1221

FIGURE 1221, shown right, comes in two standard trims—CH for oil or oil vapor at temperatures to 1000°F.;

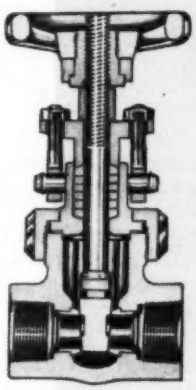
HCH for steam and other non-lubricating fluids to 850°F.

FORGED BODY, with wedge-guide machined in true relationship with bonnet joint for perfect alignment. Seat rings, of 13 Chrome stainless steel sealed tightly against body, keep out corrosive liquids, cut chemical action.

STEM, of 13 Chrome stainless steel, mates with a back-seating surface on bonnet, so valve can be repacked under full pressure. Wedge is a one-piece forging of 13 Chrome or hardened stainless steel, depending on trim.

OS&Y construction protects stem-threads from fluids and hot internal temperatures. Easy lubrication.

ALL METAL SECTIONS are extra-heavy to *exceed* recognized construction codes. Grain-pattern of forgings adds strength, provides safety, reduces wear.



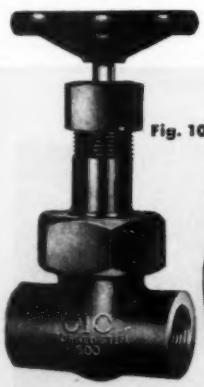


Fig. 1021

Fig. 1320

THERE ARE 262 DIFFERENT VALVES in the OIC forged steel line. It's the *longest* line ever presented to the trade at one time. Shown at left are two more gate valves—inside screw, Fig. 1021, and flanged end, bolted bonnet, Fig. 1320. But whether you need gates, globes, angles, or checks, be sure to investigate the *complete* OIC forged steel series. Write immediately for free descriptive material.

OIC

VALVES

FORGED STEEL • IRON
CAST STEEL • BRONZE

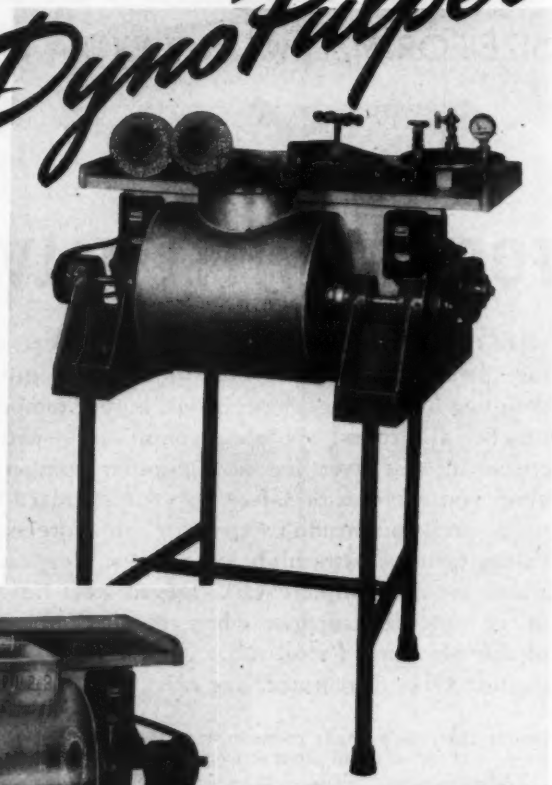
THE OHIO INJECTOR COMPANY
276 MAIN ST., WADSWORTH, OHIO

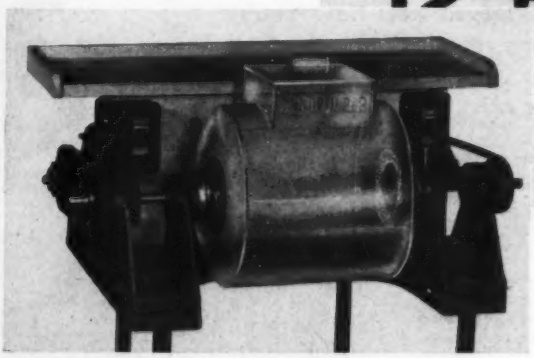
0-450-8

Here's the New Laboratory DynoPulper

With it you can:

- ★ Evaluate Waste Paper and Pulp
- ★ Recognize Wet Strength
- ★ Determine Shrinkage in Waste Paper
- ★ Establish Dirt Count on Pulp
- ★ Match Colors (two minutes)
- ★ Test Mixtures of Stock





Model 3 SP Stainless Steel Laboratory DynoPulper. Can be used under pressure.

Model 3 Laboratory DynoPulper with Plexiglass Vat.

THE DynoPulper uses two opposed DynoPellers (described below) in a cylindrical horizontal vat. The revolving DynoPellers quickly disintegrate the stock and completely separate each fibre from its neighbor.

With the Laboratory DynoPulper you can perform many experiments at low cost. Results may be readily duplicated on production machines in mill operation.

DYNOMIZING the stock in the DynoPulper may be accomplished by several different methods depending on the kind of stock being processed. Cold water, hot water and steam pressure may be used separately or in various combinations to efficiently disintegrate every type of stock including wet strength papers . . . and with sparing use of chemicals.

Dynomized fibres are strong and free, and the original fibre length is maintained. The fibres are ideally prepared for de-inking.

Send for additional information

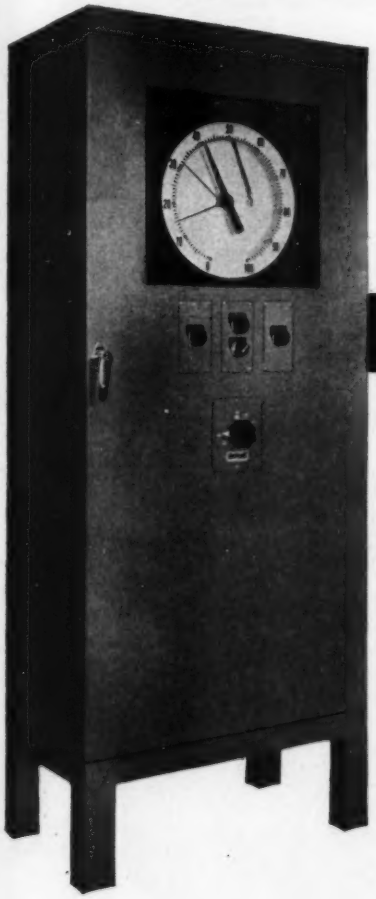
The DynoPeller
is the heart of all DynoMachines. Its concave face is lined with rough, hard carbide particles. As the DynoPeller rotates it causes a suction at its center that pulls the stock towards it. Centrifugal force then causes the stock to flow rapidly over the rough carbide particles. This effective dynomizing action completely disintegrates the stock . . . separating each fibre from its neighbor while maintaining its original length.

RICE BARTON Research Corporation
WORCESTER 1, MASS.

BROWN SPECIALIZED INSTRUMENTATION IS KEEPING PACE WITH PAPER INDUSTRY MANUFACTURING TECHNIQUES!

HERE'S HOW TO CUT LOSSES IN DRYING... IMPROVE SHEET QUALITY... WITH THE

ELECTRONIC *MOIST-O-GRAPH* RECORDER



PAPER—*made of perfectly prepared stock—can be spoiled in your dryer! To* help control this critical process, more and more mills have turned to continuous automatic measurement of moisture.

The highly visible, highly responsive Electronic *Moist-O-Graph* keeps pace with machine speeds up to 2000 ft./min. With its help the machine tender can minimize breakage, faulty finish, wrinkling and weight loss. Chipboard . . . coated stock . . . Kraft . . . book paper . . . these are only a few of the many types whose moisture can be measured. The *Moist-O-Graph*'s five-way selector permits rapid shifting to the proper range. The required number of detectors can be used to measure moisture-content at different locations in the machine as well as across the width of the web. Signal lights indicate variations beyond desired limits.

The *Moist-O-Graph* facilitates not only economical manufacture of high-grade boards and papers but also coating and converting operations. Improved quality and fewer production losses give mill management greater profit margins.

Why not make *Moist-O-Graph* records the final stamp of quality on your finished reels? Call in your local Honeywell engineer for further information . . . he is as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4489 Wayne Ave., Philadelphia 44, Pa. Offices in more than 80 principal cities of the United States, Canada and throughout the world.

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WORLD'S LARGEST ORGANIZATION FOR ADVANCED INSTRUMENTATION AND CONTROL

MINNEAPOLIS **Honeywell**
BROWN INSTRUMENTS

FOR THE PAPER INDUSTRY

YOU DON'T HAVE TO PAMPER

THE "King-clip" VALVE!

Fig. 1640

Iron Body Bronze Mounted "KING-CLIP" Gate Valve 150 lb. S.P.—200 lb. W.O.G. For steam, water, gas, air, oil and gasoline service.

THIS STURDY IRON BODY GATE VALVE is built to stand the gaff of hard usage. It is a composite of the strong construction of the original "Clip" valve pioneered by Lunkenheimer many years ago and improved design features to meet modern-day conditions. It provides maximum resistance to distortion, piping stresses and wrenching strains.

Aside from its basic rugged proportions, the "KING-CLIP" embodies these distinctive features: • non-corrosive stem-thread bearing cast in bonnet • large drain channels that really drain the bonnet • sharply tapered bronze disc that seats tight • bronze rolled-in seat rings • coarse stuffing box threads that resist corrosion and stripping • hexagon head gland • Lunkenheimer-developed stem material that eliminates stem-thread failure due to wear • easy disassembly for servicing.

Ask for Circular No. 561 which illustrates the numerous patterns in which the "KING-CLIP" is available—iron body trim with bronze and various alloys, and all-iron . . . for a wide variety of services. You'll find one or more types which you can use to profitable advantage.

LUNKENHEIMER DISTRIBUTORS

save you money...and "headaches"!

Distributors' stocks and service are a money-saving and time-conserving convenience. The more you use these handy facilities, the less you need spend for stock-room inventory and "sleuthing" for sources of supply. Call your Lunkenheimer distributor and profit from his unfailing service—not only on valves, but on the numerous other commodities necessary to keep industry in pace with the needs of these fast-moving times.

ESTABLISHED 1862

THE LUNKENHEIMER CO.

"QUALITY"

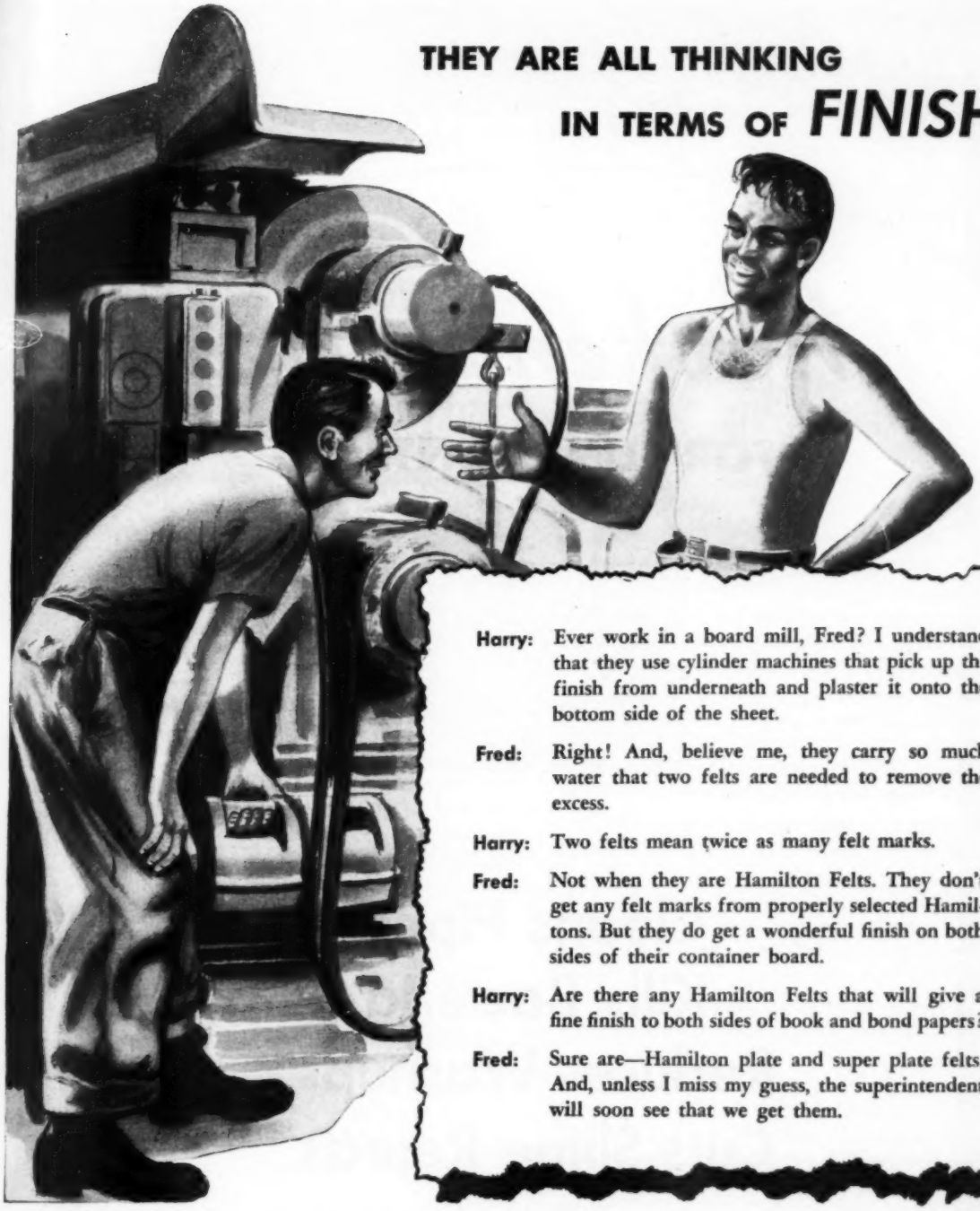
CINCINNATI 14, OHIO, U.S.A.

NEW YORK 13 • CHICAGO 6 • BOSTON 10 • PHILADELPHIA 34

EXPORT DEPT. CINCINNATI 14, OHIO, U.S.A.

The "King-clip" is king of all clip type valves!

THEY ARE ALL THINKING IN TERMS OF *FINISH...*



Harry: Ever work in a board mill, Fred? I understand that they use cylinder machines that pick up the finish from underneath and plaster it onto the bottom side of the sheet.

Fred: Right! And, believe me, they carry so much water that two felts are needed to remove the excess.

Harry: Two felts mean twice as many felt marks.

Fred: Not when they are Hamilton Felts. They don't get any felt marks from properly selected Hamiltons. But they do get a wonderful finish on both sides of their container board.

Harry: Are there any Hamilton Felts that will give a fine finish to both sides of book and bond papers?

Fred: Sure are—Hamilton plate and super plate felts. And, unless I miss my guess, the superintendent will soon see that we get them.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

• Miami Woolen Mills •

Hamilton Felts

• Established 1858 •

Merfenelopes

FOR SLIME CONTROL

In a sealed Envelope. Throw it in the beater unopened

Cleans Pipes
Kills Bacteria
Reduces Washups
Cuts Slime Rejects

R. T. VANDERBILT CO., INC.
230 Park Avenue, New York City

The Paper Industry

May 1950

What's Ahead?

ALL MARKET AUTHORITIES definitely concede that business for 1950 is going to be big—bigger than 1949 with no *ifs, buts,* or *perhaps* qualifications whatsoever. This is particularly true of the paper industry. Mills are operating at capacity plus. Back orders are plentiful and larger than they were four months ago. As the year progresses each month shows higher record performance.

Last January we said in this column that the paper industry was looking at monthly production records of over two million tons. We had never before attained that figure. We also predicted a 24-million-ton total for the year. That looked silly to the skeptics. It really was something for them to swallow. For in 1949 we produced 20.3 million tons, and to jump 3.7 million tons in one year—*"well . . . we never had done such a thing before."*

However, the trouble with saying today that a thing can't be done is that while you are saying it, some guy around the corner is doing it. Such an attitude also betrays a lack of knowledge of the facts of our free enterprise way of life.

Now comes the April 24 report from the American Paper and Pulp Association with the first-quarter production figures which states: *"Preliminary estimates for March indicate that for the first time monthly paper and board production passed the two-million-ton mark."* The Association reported March production at 2,003,000 tons.

That is certainly hanging up an all-time record-cracker, especially when one remembers that in the year 1900 the total production of paper for that year was two million tons. We now produce as much in one month as we did in a year . . . so . . . what's ahead?

The report goes on to say *"Estimates for the first quarter output of 5,682,937 tons also achieve a new high, surpassing the previous record in the last quarter of 1949. Output of the first quarter of 1950 is at the annual rate of approximately 23 million tons."* And were the production of newsprint added, a full 24 million tons would result, for the APPA statement says *"Mills producing newsprint exclusively are not included."*

This is the mid-century year of 1950.

In this year we shall consume probably 28.5 million tons of paper. Contrast this volume tonnage with a forecast made in U. S. Department of Agriculture Bulletin (No. 1241), dated July 29, 1924 (Page 27). Under the heading "Probable Future Paper Requirements" appears this statement: *"Any forecast of paper requirements must be more or less spectacular . . . The enormous present consumption of paper makes it difficult to accept consumption in 1950 as great as 13½ tons, the volume indicated by the curve."*

Those government compilers only missed their calculation by 100 per cent. They may be excused, for they had no such long-time developed trends to guide them as we now have at our command. It was impossible for them to envision the hemispherical expansion we know, or the dominant world position that we occupy.

The fact is that we ourselves are slow to appreciate the tremendous vista opening before us today. But whatever is ahead, one thing looms as the beneficent force that is accountable for our entire, matchless progress during the past fifty years, and that is our priceless, precious, free enterprise system by which we have reached a world-wide, preeminent peak, and which by all means within our power we must preserve.

For the expansive pressure for progress must have paper for its processes and have it more abundantly. Like Nicholas Nickleby the call is for "more."

A contemporary in the steel industry recently highlighted its quarterly magazine with an able article entitled "We Can't Get Along Without Paper." Of course, they can't—no one can because paper is the indispensable concomitant of civilization.

What's ahead? . . . *A steadier, heavier demand for more and more paper.* Already 1950 is a record-breaker.

VESSEL DIVISION

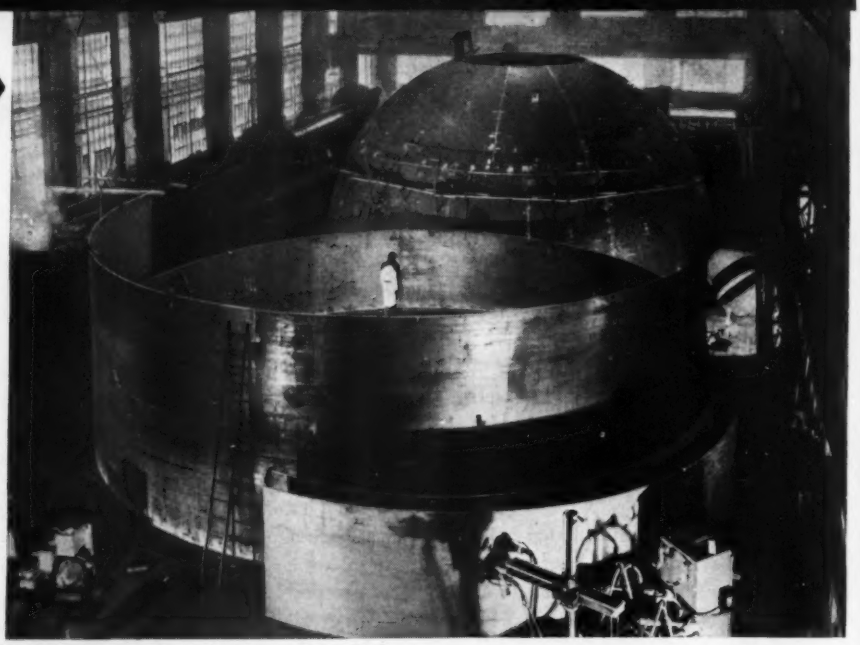
NEWS

76th ANNIVERSARY 1874 - 1950

A.O.Smith CORPORATION

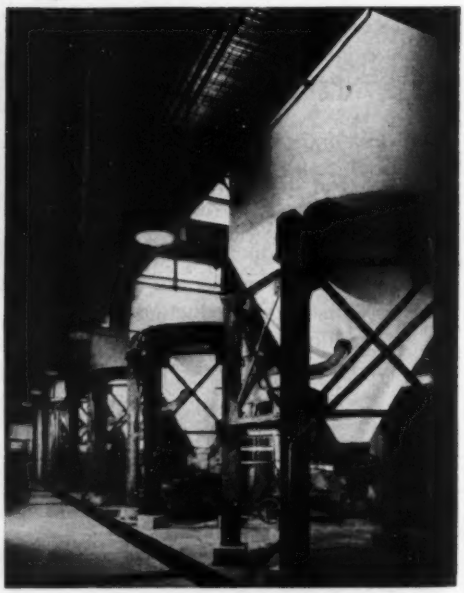
Atlanta 3 • Boston 16 • Chicago 4 • Dallas 1 • Houston 2
Los Angeles 14 • New York 17 • Philadelphia 3 • Pittsburgh 19
Salt Lake City 1 • Seattle 1 • Tulsa 3 • Washington 6, D.C.
International Division: Milwaukee 1

GIANT FOR THE PAMPAS. A. O. Smith Regenerator, approximately 45 ft. in diameter and weighing 790,000 lb., will be shipped to Argentina knocked down, then assembled in the field.



CROSSETT PAPER MILLS, Crossett, Ark., installed three A. O. Smith Digesters to increase their kraft pulp capacity.

KIMBERLY-CLARK installed these six A. O. Smith Digesters—four alloy-lined, two of carbon steel—in the new Coosa River newsprint plant at Coosa Pines, Ala.



A. O. Smith Corporation, Dept., PI-550
Milwaukee 1, Wisconsin

Without obligation, send us the latest A. O. Smith Vessel Bulletins:

- ☐ V-44: Field Assembly of Pressure Vessels
- ☐ V-46: Alloy, Alloy-lined, Clad, and Glass-lined Vessels
- ☐ V-52: Multi-Layer Vessel Manufacture and Assembly

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Can Newsprint Come Under Antitrust Laws?

▶▶▶ A SPECIAL COMMITTEE headed by Congressman Celler is making an investigation of big business on the theory that bigness—itself monopolistic in trend—will soon take on the newsprint industry. At present the hearings have been devoted to the steel industry but notice has been given that newsprint is soon to be on the grill. How a United States congressional committee can take action against an industry which is largely Canadian is a problem for the lawyers. Canadian operations are not subject to United States antitrust laws and about all that can be accomplished is an economic survey. Inasmuch as Congress itself by putting newsprint on the free list was responsible for any monopoly of the industry which can exist in Canada, the blame for present conditions can hardly be charged against United States business.

Meanwhile, newsprint consumption remains high, and supplies are anything but excessive. In fact, there are reports that a "spot" market exists, with such sales $20 per ton above the contract market. In less conservative quarters this might be called a grey market, but the paper industry term is the milder word "spot." There is little doubt that part of the shortage is due to the grade shifting in Canada by which Canadian producers are taking advantage of currency depreciation and low United States duty rates to switch from the production of newsprint to the manufacture, more profitable at present levels, of higher grade printing papers for the magazine and similar fields.

To return to Mr. Celler: He has introduced a bill to require the dissolution of any corporation whose size and power are such as to substantially lessen competition. On the other hand, steel industry witnesses told Mr. Celler's committee that the C.I.O. steel workers union has a bigger monopoly in the steel industry than any steel company has been accused of having.

More Capital Grist

Meanwhile, Washington is the center of other developments of direct bearing on industry. Committee discussion is still under way on the extent to which excise taxes are to be reduced on luxuries and other commodities. The discussion is progressing so slowly that the committee can hardly present the bill to the House of Representatives before June 1, and after that date there will be debate in the House before the final measure goes to the Senate for further discussion.

The problem of postal rates came before the Senate Post Office committee on April 25, and there will be a prolonged debate. The Magazine Publishers Association will oppose the proposal to raise rates on second-class matter and the paper industry has taken the position that the measure will curtail wide uses of printing paper. The bill is introduced on the theory that it will increase the revenues of the Post Office Department about $130,000,000. The Hoover Commission proposed that the Post Office Department be required to balance its budget by reduction of operating costs, rather than by calling on taxpayers to foot the bill.

The Secretary of Labor has announced that he will study all minimum wage rates under the Walsh-Healy Contracts Act to see if they represent the prevailing minimum rates in various industries. He has already started on the paper and pulp industry where the minimum rate is now 75 cents per hour. If the study results in fixing a higher wage rate for companies selling paper to the Government the only result will be less business for small business and higher prices for Government paper.

For the next month much industry attention will be focused on the proposals to reduce duty rates on paper by a third round of tariff rate reductions to be negotiated at Torquay, England, beginning Sept. 28. The State Department has issued a long list of grades of paper, including book paper, paperboard and many special grades, which will be subject to negotiation. Groups in the paper industry will file briefs opposing the reductions by May 17 and open hearings are scheduled to begin May 24. According to paper industry authorities present rates are already practically on a free trade basis, when the depreciation of foreign currencies is included in sales of foreign paper. Printing papers are now being imported at prices which mean a duty rate of less than 10 per cent as against a depreciation of Canadian currency of 10 per cent and depreciation of European currencies by 30 per cent. The net result is that foreign papers are imported with a bonus to the producers, instead of being subject to a protective tariff. For example, Scandinavian kraft is dutiable at 10 per cent, and the currency has been depreciated 30 per cent, with the result that the paper of this grade comes into this market 20 per cent to the good after duty has been paid. The only salvation of this branch of the industry is the fact that Scandinavia can not produce sufficient tonnage to meet consumption demands in this country, though low prices can violently affect domestic price quotations.

As of April 30 the Annecy agreement with Sweden became effective, resulting in reduced duty rates on various paperboards, greaseproof and sulphite wrapping papers. Finland has agreed to the Annecy proposals, and as of May 25 the duty rate on kraft will become 10 per cent instead of the 30 per cent rate fixed by Congress in 1930. Other grades are similarly affected.

The demand for paper continues high, with no sign of any relaxation before July. Many mills are from six to eight weeks behind orders and consumption seems to be keeping up to production. March production figures broke all records, output for the month for the first time passing the two million ton mark. The last quarter's production was at an annual rate of 23,000,000 tons. This is all the more striking when it is realized that production in 1939 and 1940 was at an annual rate of 14,000,000 tons.

Nationally famous economists have issued words of caution against the

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...keep an accurate check on relative humidity and temperature

Keeping posted on temperature and relative humidity is just common sense in the paper industry. These two vital factors affect not only the output of your plant and machinery, but also play an important part in determining the quality of the finished product. Be sure of the proper combination of temperature and relative humidity in your plant . . . insist on Bendix-Friez instruments for unparalleled precision and economy in this type of work.

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wave of pension plans which are being forced on industry by union organizations. It is suggested that some companies are possibly being driven into pension responsibilities which may force them to be slower in making outlays for improvements and expansion than normally would be the case.

Financial

PAPER MILL SECURITIES remained at high levels during the month, with earnings reports by many companies showing material increases in the first quarter of 1950 as compared with the similar quarter in 1949. The drop in earnings with the slowing down of operations did not become evident in 1949 until the second and third quarters, but sales have rebounded since that time.

Chesapeake Corp.—Net income for twelve weeks ended March 26 was $672,546 as compared with $482,258 for the comparable period a year ago.

Container Corp. of America—Net income for the first quarter was $2,274,432 as compared with $1,974,313 for the same period in 1949.

Continental Diamond Fibre Co.—Net income for the year 1949 was $518,677 as compared with $862,465 in 1948.

Dixie Cup Co.—Net income for the year ended March 31 was $2,038,039 as compared with $1,760,683 for the previous fiscal year.

Robert Gair Co.—Net income for the first quarter (including subsidiaries) was $1,091,366 as compared with $1,241,064 a year ago.

Great Northern Paper Co.—Net income in 1949 was $4,865,631 as compared with $4,620,512 in 1948.

Hammermill Paper Co.—Net income for the first quarter was $356,243 as compared with $214,102 for the same quarter in 1949.

International Paper Co.—Net income for 1949 was $51,646,789 as compared with $60,489,266 in 1948.

Keyes Fibre Co.—Net income for the first quarter was $309,535 as compared with $181,729 a year ago.

Mead Corp.—Net income for twelve weeks ended March 19 was $1,073,909 as compared with $947,570 for the comparable period a year ago.

Nekoosa Edwards Paper Co.—Net income for the first quarter was $395,256 as compared with $345,307 a year ago.

Riegel Paper Corp.—Net income for thirteen weeks ended April 12 was $407,767 as compared with $258,746 for the same period in 1949.

St. Regis Paper Co.—Net income for the first quarter was $2,015,553 as compared with $2,205,487 a year ago.

Soundview Pulp Co.—Net income for the quarter ended March 31 was $1,160,922 as against $1,358,949 the previous year.

Sutherland Paper Co.—Net income in 1949 was $1,613,629 as compared with $2,069,673 a year ago.

Paper Mill Corporate Changes

Keyes Fibre Co.—Stockholders have approved a recapitalization plan which provides for a new class of $25 first preferred stock with 200,000 shares authorized. The first 100,000 shares will be issued at a dividend rate of 5.6 per cent. Holders of 12,293 shares of 6 per cent preferred will be offered five shares of the new preferred for each share of the old with cash to cover the excess of the call price over the initial price of the new offering. The prior preferred stock is callable at 115. The present 60,000 shares of Class A common of no par value will be exchanged for an equal number of shares of $10 par, and 150,000 shares of common will be changed to $1 par stock and the number of shares increased to 500,000.

P. H. Glatfelter Co.—Wall Street agencies are to handle an offering of 20,000 shares of 4½ per cent cumulative preferred and 70,000 shares of common stock to holders of 20,000 shares of outstanding 5 per cent cumulative first preferred stock on the basis of one share of the new preferred and three and one-half shares of common for each share of the old preferred.

Marcalus Manufacturing Co.—Advertisements in New York financial papers offer the pulp and paper mills at Lincoln and Livermore Falls, N. H., for sale in order to effect a reorganization. The offer values the properties at $6,500 with a possible opportunity to buy the property at better than 10 cents on the dollar. Offers are to be presented to a New Jersey Federal Court.

Chemwood Corp.—The former Amoskeag Paper Co. has been taken over by the Kleen Fibre Corp.

New York Stock Exchange—Stocks

	Closing Prices Apr. 25, 1950	Mar. 25, 1950
A.P.W. Products	*3⅜-3⅝	3⅛
Celotex	18⅛	19⅛
Same Preferred	17⅛	17⅛
Certain-teed Products	17⅛	17⅛
Champion P & F Co.	33	34
Same Preferred	103	105
Chesapeake Corp.	28¼	28½
Continental Diamond	9⅜	8⅞
Container Corp.	45½	45
Same Preferred	103½	105
Crown Zellerbach	32⅛	33
Same Preferred	105	104½
Same $4 Preferred	*103-105	104½
Dixie Vortex	45¼	39⅝
Same "A"	* 52¼-53¼	56
Eastern Corp.	16¼	14⅝
Robert Gair	8	7¼
Same Preferred	*17⅜-18	18½
Gaylord Container	19	19⅛
International Paper	40⅜	39⅝
Same Preferred	106½	106¼
Kimberly-Clark	31⅜	29⅝
Same Preferred	127	119⅜
McAndrews & Forbes	40¼	40½
Marathon	29¾	29
Masonite	63	59⅝
Mead Corp.	21	18¼
Same Preferred	99	99¼
Same 2nd Preferred	*41-43¼	38
National Container	8	8
Paraffine Cos.	16⅝	17½
Same Preferred	*100¼-101	100¼
Rayonier, Inc.	28⅝	27½
Same Preferred	31⅜	31⅜
Scott Paper	85	76⅝
Same $3.40 Preferred	*96-97	96¼
Same $4.00 Perferred	*106¾-107¼	106½
St. Regis	8⅛	8
Same Preferred	89	87
Sutherland Paper	*39¼-39¼	41¼
Same Preferred	*110¼-111	110½
Union Bag & Paper	27⅝	29⅜
United Board & Carton	*8¼-8⅝	8⅛
United Wall Paper	4⅛	3¼
Same Preferred	25	25
U. S. Gypsum	122¼	117⅝
Same Preferred	*186-187	187¼
West Va. P & P Co.	46	47¼
Same Preferred	*110⅛-111	*168¼-110

New York Stock Exchange—Bonds

A.P.W. Products 3⅝	*80-83	*81-85
Celotex 3¼%	101⅛	100
Champion P & F Co. 3½	*103-103⅜	102
Mead Corp. 3½	102½	102½

New York Curb Exchange—Stocks

Am Writing	*6⅜-7	6⅝
Great Northern	40¼	41½

*Closing Bid and Asked Prices

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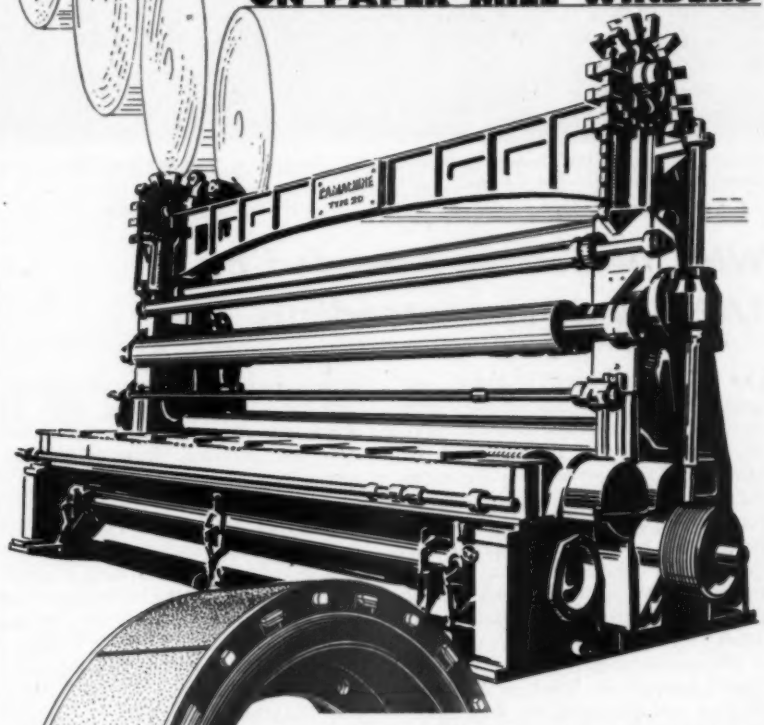

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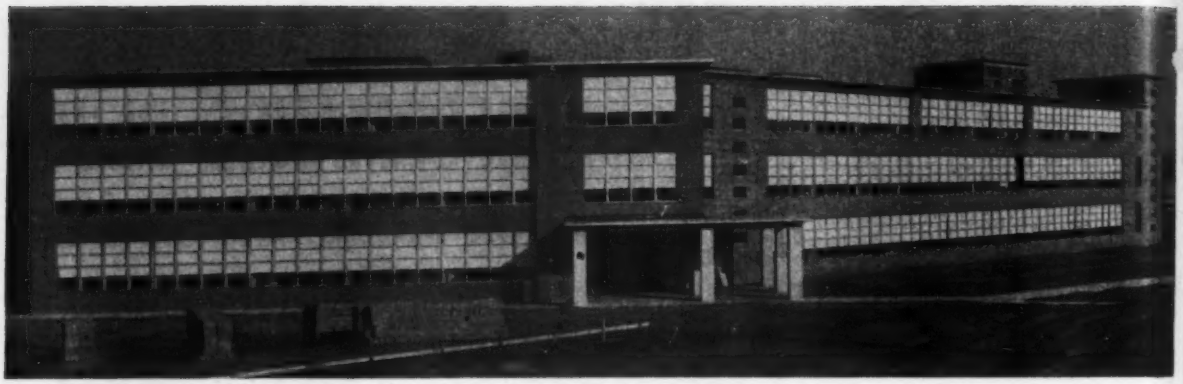


William McCracken Hall, housing pulp and paper laboratories, chemistry and physics departments in the new pulp and paper technology school at Western Michigan College

WMC Dedication Attended by TAPPI and Superintendents

▶▶▶ GRAPHIC ARTS DAY, co-sponsored by the Kalamazoo Valley Section of the Technical Association of the Pulp and Paper Industry and the Michigan Division of The American Pulp and Paper Mill Superintendents Association, Inc., brought together about 200 technical and production men of the paper, ink, and printing industries for an all day and evening meeting on April 6, at Kalamazoo, Mich.

These men gathered in the morning with educators of Western Michigan College (Kalamazoo) in McCracken Hall on the campus to participate in the dedication of the Pulp and Paper School of the College as well as the equipment donated to the School by Industry. The afternoon was given over to a graphic arts forum; the evening, to a dinner meeting. Both the afternoon and the evening sessions were held at Hotel Harris in Kalamazoo.

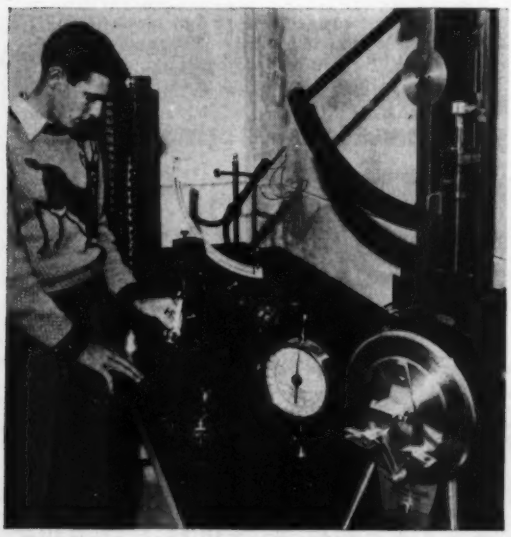
The day was the combined project of the College faculty representatives in the chemistry and vocational education departments, the industrial advisory committees which brought the paper technology school into being, Kalamazoo Valley Section, Technical Association of the Pulp and Paper Industry and Michigan Division, American Pulp and Paper Mill Superintendents Association.

On the dedication program at McCracken Hall were Dr. Paul V. Sangren, president, Western Michigan College; Dr. Deyo B. Fox, director of vocational education, Western Michigan College; O. W. Callighan, Edgar Brothers Co.; and Dr. Gerald Osborn, head of chemistry department, Western Michigan College.

In the morning program the two associations participated only incidentally as interested parties, while they assumed full charge of the afternoon and evening technical study sessions. It was announced at the dedicatory ceremony that the TAPPI section had set up a fund of $300 to be used as awards, $100 each year, to the continuing student in the paper technology school who completed the year with the highest grades.

Dr. Sangren welcomed the visitors at the opening of the session. He also closed the meeting with his dedication of the laboratory in these words—"... to the welfare of the youth and the benefit of the people of the State of Michigan."

The remarks of Dr. Fox covered the



Air-conditioned paper testing lab at WMC

Pulp evaluation equipment, Pulp and Paper Technology School

Plaque unveiled at dedication ceremony of the Pulp and Paper Technology School. Left to right: Dr. Paul V. Sangren, president Western Michigan College; O. W. Callighan, chairman of the equipment procurement committee; Dr. Gerald Osborn, professor and head of the chemistry department; Dr. Deyo B. Fox, head of the vocational education department; Dr. Alfred H. Nadelman, head of the new school (Read list of equipment contributors shown on plaque on this page.)

Atlas Press Company
Albany Felt Co.
Allied Paper Mills
American Cyanamid Co.
American Coating Mills
Anheuser Busch, Inc.
Archer Daniels Midland Co.
Asten-Hill Mfg. Co.
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Bermingham and Prosser Co.
Bird Machine Company
Black-Clawson Co.
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Brown Company
Buffalo Electrochemical Co.
Cameron Machine Co.
R. Cramer, Electric Contr.
Cellulose Sales Co.
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Commercial Testing & Eng. Co.
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Garrett Burgess, Inc.
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Georgia Kaolin Company
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Holyoke Wire Cloth Co.
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Kalamazoo Paper Co.
Kalamazoo Mill Supply Co.
Klose Electric Corp.
Kalamazoo Vegetable Parchment Co.
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Lee Paper Co.
Link-Belt Co.
J. E. Loughead Co.
Lindsay Wire Weaving Co.
Mac Sim Bar Paper Co.
Malcomson, Fowler & Hammond, Inc.
Martinson Machine Company
A. M. Meincke & Son, Inc.
Midland Coal Corp.
Michigan Paper Co.
Miller Davis Co.
National Gypsum Company
National Aluminate Corp.
Noble & Wood Machine Co.
Paper & Twine Assn.
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R. T. Vanderbilt Co.
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Wallace & Tiernan Co.
Western Board & Paper Co.
Wheeler Roll Co.
Westinghouse Electric Corp.
Wyandotte Chemicals Co.
Weyerhaeuser Timber Co.
Woodruff Coal Co.
Williams-Gray Company
Wrenn Paper Co.
and Anonymous Friends

history of the pulp and paper project from its inception. He named the members of the several committees; and stressed the fact that the project is aimed toward infusing a progressive spirit into the industry through the training of young people for employment in it.

Special credit was given to Ernest E. Ludwig, vice president, Bermingham & Presser Co., chairman of the advisory committee, who in a conversation with Dr. Fox gave birth to the idea; and to William A. Kirkpatrick II, acting chairman of the same committee, who had expressed a wish for such a school. Both men were praised for their hard and consistent work in getting the project under way.

O. W. Callighan was the chairman of the laboratory equipment committee; and, as such, he not only presented the equipment which had been donated by Industry to the College, but also unveiled a plaque which is to be placed at the entrance of the laboratory. The plaque, a plastic production designed by Miss Lydia Seidschlag, instructor in the art department of the College, bears the names of 103 donors of equipment and money.

The program at the College was completed with an "open house" of the pulp and paper school. That feature of the occasion gave everyone present at the dedication the opportunity to inspect first hand all of the facilities of the school for the training of future papermakers.

After luncheon at the Hotel Harris, the TAPPI men and Superintendents with William F. Hathaway, chairman of the Michigan Division of the Superintendents Association presiding, met in an afternoon session to listen to three papers. Speakers at this session, which was designated as a graphic arts forum, were: Joe Martin of the Champlain Co.; Milton Zucker, research manager of International Printing Ink Co.; and Chester F. Carlson of Haloid Co.

Mr. Martin spoke on "Gravure's Place in the Graphic Arts Industry"; Mr. Zucker, "Developments in the Printing Ink Industry," and Mr. Carlson, "Xerography and Xerographic Printing."

Mr. Martin related that gravure printing remained as a supplement to typographic printing until its application to cellophane and foil gave it the impetus to bring it into practical industrial use. The early use of gravure printing, he said, was mainly for the printing of rotogravure sections of newspapers. Its use has been broadened, he said, because of its one-operation procedure, its speed, and its application in multi-color printing.

Mr. Zucker stated that many problems relating to printing inks are still to be solved. He related that the industry hasn't been too successful in replacing rule-of-thumb methods with scientific systems. He touched upon tackiness of inks, as well as drying time and rubbing resistance, commenting that there seems to be little correlation between tests and actual practice.

Alfred H. Nadelman

He also touched upon the problem of ink distribution. On this problem, he said, his laboratory had come to the conclusion that weighing the ink on a product was no way to determine its distribution.

Mr. Zucker cited two questions on which his laboratory is still working for an answer. These questions are: "How

KEY FIGURES IN THE GRAPHIC ARTS FORUM, feature of a joint meeting of Kalamazoo Valley Section of TAPPI and the Michigan Division of The American Pulp and Paper Mill Superintendents Association. Seated (L to R): Dr. Stephen I. Kukolich, chairman, Kalamazoo Valley Section of TAPPI; Joe Martin, Champlain Co.; and Chester F. Carlson, Haloid Co., inventor of Xerography. Standing: Norman I. Bearse, technical director, the Champion International Co., Robert H. Simmons, chemist of the GPO; Dr. Milton Zucker, research manager of the International Printing Ink Co.; Dee James Andella, production director, National Geographic, in the illustrations division, and Wm. F. Hathaway, chairman, Michigan Division of the Superintendents Associaton

can the printability of a given ink on a given paper be predicted?" and "What various variables in the typographical printing process affect the result?"

The paper by Mr. Carlson on "Xerography and Xerographic Printing," included a demonstration of the process. The demonstration was handled by Bernard J. Schnacky of Addressograph Multigraph Co.

The meeting was concluded with a dinner program in the evening. At this meeting Dr. Stephen I. Kokolich, chairman of the Kalamazoo Valley Section of TAPPI, presided and Norman I. Bearse, technical director of the Champion International Co., was toastmaster.

The speaker of the evening was Robert H. Simmons, chemist, U. S. Government Printing Office, Washington, D. C.

Talking on "Printer's Paper Troubles," Mr. Simmons dealt with atmospheric conditions, formation of the paper, sheet thickness, sheet smoothness, ink receptivity, ink coverage, ink drying, offset, strike-through, pick, opacity, color of paper, mechanical troubles and printing equipment speeds.

This program closed with a round-table discussion. Members of the round table included Mr. Mearse (as moderator), Joe Martin, Milton Zucker, Chester F. Carlson, Robert H. Simmons, Morlan Grandbois of St. Regis Paper Co., Frank Stowitts of Michigan Carton Co.; and William A. Kirkpatric of Allied Paper Mills.

Charles H. Reese, vice president of Nekoosa-Edwards Paper Co. and president of the Superintendents Association, praised the two local groups for their cooperative efforts, and commented favorably on the new pulp and paper school at Western Michigan College, in his remarks at the dinner meeting. Mr. Reese spoke of the new school as being fittingly placed in the center of a region so long a vital area in paper production.

U. of Maine Offers New Paper Course

A new five-year course in pulp and paper technology will be offered at the University of Maine next fall. An optional program in the department of chemical engineering, the new curriculum will be specifically designed for young men interested in becoming qualified for positions in production. It will not replace the present four-year course nor the five-year program leading to the master of science degree.

Students enrolled in the new course will cover the usual requirements for the first three years of chemical engineering or equivalent preparation, and will spend the fourth and fifth years in studying specialized courses in pulp and paper as well as approximately an equal concentration upon economics, business, and psychology.

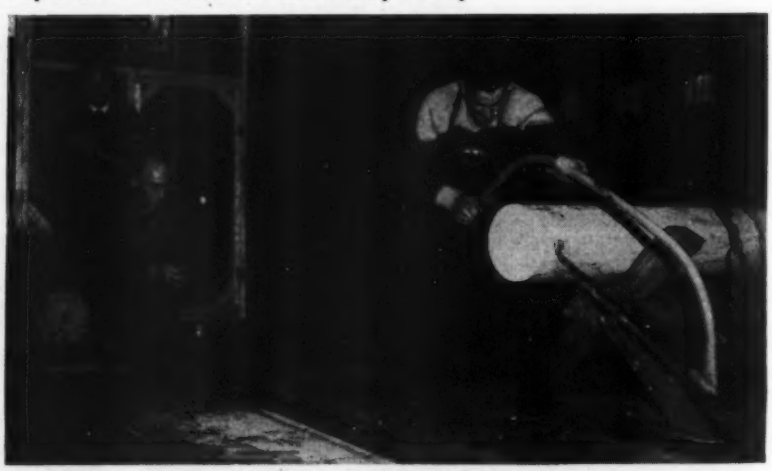
Commercial courses will include labor problems, personnel management, corporation finance, business law, and marketing; practical experience will include a minimum of two summers spent at work in industrial plants.

Approved only for those students who appear from certain tests and academic attainment to have aptitude and interest in management vocations, the five-year course will lead to the B.S. degree and simultaneous award of a special certificate.

Scholarships and fellowships from the recently established University of Maine Pulp and Paper Foundation will be available for some qualifying students. An advisory committee made up of representatives of the industry who are experienced in production and management duties will serve in the program's administration.

Young men already doing industrial work and qualified for entrance are invited to obtain further details from Professor Lyle C. Jenness, head of the department of chemical engineering; applications for admission should be submitted to Percy F. Crane, director of admissions for the university.

Paper Co. Contestant Wins Championship



Meet the new Canadian Saw and Axe Champion, Dominique Chenard. This woodsman from Le Bic, Rimouski County, P.Q., represented the Quebec North Shore Paper Co. at the Montreal Sportsmen's Exhibition. He nosed out by only two-tenths of a second Yvon Larochelle, representative of the Canadian International Paper Co. The contest was sponsored by the Canadian Pulp and Paper Association. Preliminary competitions in forest camps created widespread enthusiasm among some 40,000 workers of the pulp and paper industry in Quebec, Ontario, and New Brunswick. The contestants were required to saw through ten-inch green spruce logs

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Flow Spreader Ends "Wild Sheet" Formation

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Hollingsworth & Whitney Co. Mobile, Ala.	4
Union Mills Paper Manufacturing Co., New Hope, Pa.	3
U.S. Gypsum Co., Oakmont, Pa.	1
Crocker-Burbank & Co., Ass'n Fitchburg, Mass.	8
The Flintkote Co., New Orleans, La.	1
New Haven Pulp & Board Co. New Haven, Conn.	3
Eastman Kodak Co., Rochester, N.Y.	2
Kimberly-Clark Corp., Neenah, Wis.	1
St. Mary's Kraft Corp. St. Mary's, Ga.	1
Pioneer Div. The Flintkote Co. Los Angeles, Calif.	1
San Rafael Paper Co., Mexico	2
Groveton Papers Co., Groveton, N.H.	1
Rushmore Paper Mills, Inc. Natural Dam, N.Y.	1
Congoleum-Nairn, Inc. Cedarhurst, Md.	1
Fibreboard Products Inc. E. Antioch, Calif.	1
A. B. Stjernfors Stalldallen, Sweden	3
A. B. Papyrus, Sweden	3
St. Regis Paper Co., Tacoma, Wash.	1
Papierfabrik Utzenstorf, Switzerland	1
The Ohio Boxboard Co., Rittman, O.	3
Calcasieu Paper Co., Elizabeth, La.	1
National Newsprint & Paper Mills, Ltd., India	1
Total	48

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THE SIGN OF TRADE MARK SUPERIOR QUALITY

Eliminates three out of four hydraulic cleaning jobs . . .

● Once a month these Gage-Matic machines had to be shut down for cleaning of the hydraulic systems. Sticky valves and heavy deposits were a serious problem. The Stephens-Adamson Mfg. Co., Aurora, Illinois, asked a Standard Oil lubrication specialist to solve it.

He recommended using STANOIL Industrial Oil. This is a highly stable product containing an oxidation inhibitor and an anti-foam agent. *It proved to be exactly right for this application.* Valves now operate smoothly and efficiently. Contamination has been minimized. Cleaning of hydraulic systems is necessary now only at three-to-four month intervals.

These benefits are typical of those gained on a wide variety of jobs by STANOIL users. This multi-purpose oil is notable for long oil life and for clean, reliable lubrication of speed reducers, air compressors, and circulating systems. A

STANOIL
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Industrial Oil

Standard Oil lubrication specialist will help you take full advantage of STANOIL's versatility. This specialist is located within easy reach of your plant. How you can benefit by his on-the-spot lubrication service is explained at the right.

Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

What's YOUR problem?

● William Voegeli, of Standard Oil's Joliet, Illinois office, is the lubrication specialist who helped this customer solve a troublesome hydraulic oil problem. Standard's lubrication specialists are located throughout the Midwest. One of them is within easy reach of your plant. He offers you on-the-spot lubrication service that's backed by extensive experience and training in the use of modern lubricants and fuels. He can help you make important reductions in operating and maintenance costs.

Arrange, today, for a visit of a lubrication specialist by phoning or writing the nearest Standard Oil Company (Indiana) office. Ask him to give you actual performance data on these outstanding products:

STANOIL Industrial Oils—This multi-purpose line of oils provides cleaner operation of hydraulic units, supplies effective lubrication in air compressors, gear cases, and circulating systems. One or two grades can replace a wide variety of special oils and lubricants.

CALUMET Viscous Lubricants—These greases strongly resist washing and throw-off. Their superior wetting ability affords better coating of open gears and chains, better internal lubrication of wire rope.

STANORUST Rust Preventives—The eight grades of STANORUSTs form one of the most complete and effective lines of rust preventives on the market today. Each has been scientifically and specifically developed for its intended use. The grades range from a fingerprint remover to a heavy petrolatum that protects against corrosion for years under the most severe outdoor exposure.

STANDARD OIL COMPANY (INDIANA) STANDARD

Hawthorne Paper Co. Under New Management . . . Reorganization

▶▶▶ CHANGE OF OWNERSHIP and a complete reorganization of the Hawthorne Paper Co., Kalamazoo, Mich., became effective on April 19 when a special meeting of the board was called and all officers and directors resigned. A new board, headed by William Slavin, president and treasurer of the Western Board and Paper Co., Kalamazoo, took over. The other board members of the company are J. L. Slavin, S. D. Zatz and H. A. Sayre, both of Chicago, and Leon A. Slavin.

William Slavin was elected president, treasurer, and general manager; J. L. Slavin was named vice president, and S. D. Zatz became secretary. Mr. Slavin stated that the plant will continue operations without interruption and that no changes in operating personnel are contemplated.

William Slavin

Prior to the election, William Slavin had obtained 92,000 shares of the 100,000 shares of company common stock.

Officers and directors who resigned when the new management took over were: George H. Gerpheide, president and general manager, who will remain with the company for a time in an advisory capacity; M. H. Stetson, vice president in charge of sales, who has also agreed to remain for a limited period; C. Hubbard Kleinstuck, vice president and assistant treasurer; Charles J. Monroe, treasurer; Charles M. Chase, secretary, and Alfred B. Connable, Sr., and George T. Jubb.

Hawthorne is known as a fine paper mill, a rag mill, with its products bond, ledger, and writing papers; index Bristol, text, cover and thin paper, including manifold and onion skin. It also specializes in specification paper.

The company was organized in 1911 and began operations the following year. It was promoted and organized by Robert L. Pease and A. H. Dwight, with P. B. Wheeler as the first manager. The mill started with one machine; a second one was installed in 1916. Up to that time, the paper manufactured had been all rag content and loft dried. Operations were broadened to include other materials in later years, but all rag content papers are still manufactured.

A. H. Dwight, first president, took active charge as manager of the company in 1913 and continued in that position until his death in 1926, when George Gerpheide was elected president and general manager.

The two fourdrinier machines have a combined capacity of from 12 to 12½ tons daily. The company recently installed a new Victory Beater (Cf. P.I. and P.W., Nov., 1949), a 2,600-pound batch run apparatus controlled automatically by electrical means.

C-Z Given Permit to Extend Pipeline from Camas Plant

A permit has been issued by the corps of engineers to Crown Zellerbach Corp., for an extension of the firm's discharge pipeline from the Camas, Wash., pulp and paper mill.

The pipeline will be extended from a point in Camas slough to the main Columbia river south of Lady Island. (Cf. P. I., April, 1950)

Issuance of the permit was made despite objections by several yatch clubs, boating organizations and other groups. Officials of the engineering division for the Portland, Wash., district said the engineers had no recourse but to grant the permit since objections were based on fears of pollution instead of navigation disadvantages, the only basis on which the permit could have been denied.

Extension is expected to reduce concentration of wastes to such an extent that commercial fishing conditions will be improved.

Canadian Legislature Lifts Injunction Against Espanola

A special act of the Ontario, Canada, legislature, permanently lifting an injunction sustained by the supreme court which would have closed the Espanola pulp and kraft paper mill of the Kalamazoo Vegetable Parchment Co. April 4, has cleared up that long standing snarl.

The injunction was lifted only a few days before the writ, obtained following a suit charging stream pollution, would have become effective, throwing about 1400 persons out of the only employment offered them in the entire region.

A suit instituted by six persons living downstream from the KVP Co., Ltd., plant on the Spanish river resulted in the injunction. As stated earlier in this magazine (*Cf.* P.I. Feb., 1950), the suit was brought on the charge that the river was polluted by sulphite waste. After it was instituted, the six principals offered in a letter to KVP to settle for $300,000, waiving claims to any past or future damage.

The company fought the suit but lost it on the basis of an old English law which provides that nothing may be put into a stream that will change the nature of the water—an act aimed at barnyard practices of farmers in the days of common law.

An appeal was filed by the company. After the appeal, and before the supreme court had acted upon it, the legislature passed an act presumed to protect all the scores of pulp and paper mills of Canada against just such injunctions. The act specifically charged the judges to take into consideration all the economic factors involved, and specified that mills which had "pending suits" were included in the act.

It was thought that the act would clear the KVP company, but the supreme court later ruled that since the court had acted the Espanola case was not in litigation, and the injunction against the firm was valid. It was this situation that the legislature cleared up permanently by its action.

"Belgo" Mill of Consolidated Paper Undergoing Extension

The extension being constructed for the "Belgo" pulp and paper mill of Consolidated Paper Corp. Ltd., Montreal, at Shawinigan Falls, Quebec, will provide two stories built with brick curtain walls with reinforced concrete foundation at a total cost of about $300,000.

Last year the firm completely modernized the grinder room ot its Wayagamack division, Three Rivers; and continued modernization of a sulphite mill at Port Edward.

Bathurst P&P Co. Plans Two New Plants

Construction of two new plants is being planned by Bathurst Power & Paper Co., Bathurst, N.B. A pulp plant to use hardwoods will be located at Bathurst. It is expected to be ready for operation this fall, the equipment having been ordered and contracts placed for the delivery of woods needed in a new process using hardwoods.

Contracts have been placed for the construction of a new corrugating plant at St. Laurent, Que., and that plant is expected to be ready for operation by next fall.

Schweitzer Organizes New Laboratories

A new department, designed to make available to the cigarette, radio, television, automotive, carbonizing, Bible, airmail paper and other industries, the facilities of the largest combined specialized paper laboratories in the United States has been established by Peter J. Schweitzer, Inc., New York, owners of Smith Paper, Inc.

Extensive plans for modernization of Smith facilities will be installed within the next two years. Methods developed in the Elizabeth, Jersey City, Spotswood, N. J., and Mount Holly Springs Pa., plants of the Schweitzer firm will be introduced into the Eagle, Columbia, Niagara, Centennial and Valley plants of the Smith firm.

The new department, to operate under the direction of George Mintz, general manager and vice president, is the result of pooling and amplifying laboratory facilities and research staffs of the Schweitzer company and its recently acquired subsidiary, Smith Paper.

Union Bag to Make Scutan Papers in Savannah

The Scutan waterproof and moisture vapor barrier papers of Union Bag & Paper Co., New York, are now being manufactured at Savannah, Ga. The manufacture was moved from the Hudson Falls factory of the firm to bring the operation closer to the raw paper supply.

Equipment for the Scutan production in Savannah now includes a Duplex Machine trim 72 in., a Triplex Machine trim 96 in., one Bat-Bak Machine, and one waxing Machine trim 72 in. With this equipment, and all other necessary for Scutan production, Union Bag is able to give distributors cost advantage benefits resultant from having many products manufactured and shipped from one central location.

Mich. Commission Sets Date for Inspection of Waste Treatment Plant

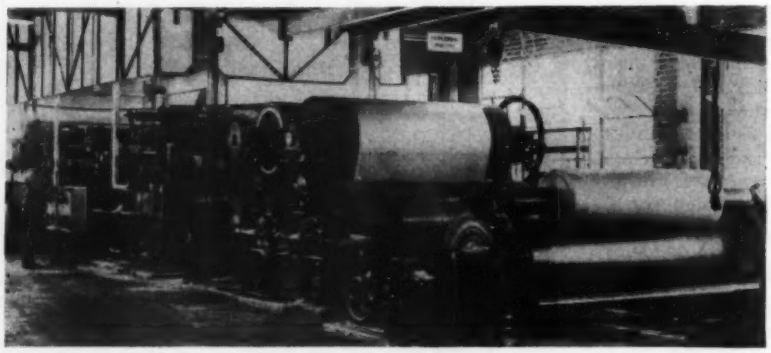
The first full scale plant for treatment of de-inking wastes from paper mills will be inspected by the Michigan State Water Resources Commission next September. The commission has arranged to have its September meeting in Kalamazoo, tentatively Sept. 19 and 20. It will include a visit to the waste treatment plant now under construction at the Michigan Paper Co. plant in Plainwell, Mich., as part of its program. (*Cf.* P. I. AND P. W., May, 1948)

Dwight Stocker, president of the Michigan Paper Co., under whose direction the waste treatment plant is being built, said that it will be in operation when the commission makes its visit. If present plans are carried through, it will go into operation some time in June. The plant is designed to demonstrate the biological aeration treatment of de-inking wastes.

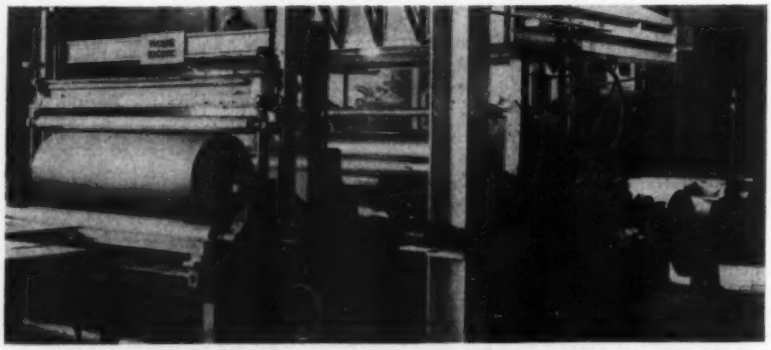
A report of the National Council for Stream Improvement, Inc., to the commission recited how the plant had grown from laboratory and pilot-plant study to a full scale plant to solve the problem of disposing of de-inking wastes without polluting streams into which they are discharged.

The report pointed out that the Kalamazoo River Improvement Co. was formed in 1949 as a non-profit organization. Six Kalamazoo area paper mills participated, the same that had helped finance the preliminary studies, in the organization with the aim of building the first commercial-sized plant to demonstrate the aeration technique developed through the pilot-plant operation.

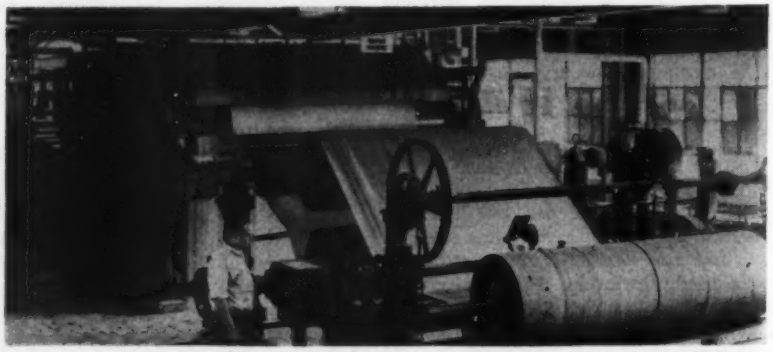
Under terms of the incorporation, the demonstration period is a year. Supervision of plant operation and continued experimentation with sludge filtration and disposal and commercial-type air diffusers will be undertaken by the engineer of the National Council for Stream Improvement at the Plainwell plant.



Triplex machine (96 in.) for production of infused, reinforced, and high moisture vapor barrier papers



Waxing machine (72 in.) for production of various grades of waxed papers for specialty bags and industrial protective wrappers



Creping machine (120 in.) for production of crepe with variations of 6-33 per cent stretch in basis weights from 25-120 pounds

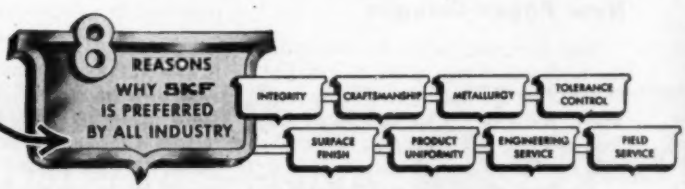
PILLOW BLOCKS ENGINEERED BY SKF

Specify pillow blocks and flanged mountings by SKF and you get bearings and housings engineered as a unit. What does this mean to you?

It means you get the full benefit of SKF's skill and precision methods of manufacture. It means you're sure of minimum friction and trouble-free, low-cost operation. It means efficient seals that retain lubricant . . . keep out dust and abrasive elements. It means minimum maintenance . . . maximum efficiency.

SKF supplies 5 basic types of pillow blocks for shafts from ½-inch to over 9-inches . . . and 2 basic types of flanged mountings for shafts from ½-inch to 2 7/16-inches. Whether you need Series SES for lightly loaded applications or Series SDAF to withstand unusual shock and heavy thrust loads . . . or any intermediate type . . . there's an SKF pillow block that's exactly right for the job.

Check your SKF Distributor, he has a stock of these pillow blocks and flanged mountings to meet *all* your requirements. *SKF Industries, Inc., Philadelphia 32, Pa.* 7044



SKF PILLOW BLOCKS

Pioneers of the Deep Groove Ball Bearing—Spherical Roller Bearing—Self-Aligning Ball Bearing

KVP Installs Third Gravure Printing Press

A new Robinson four-color gravure printing press has been installed in the aniline-gravure printing department of the Kalamazoo Vegetable Parchment Co., Parchment, Mich., bringing to three the Robinson color presses in the department.

The first four-color, as well as a two color, press was installed last year; there are now six gravure presses, or sixteen color units, in the department. The others are a three-color Hy-Roto, a two-color Waldron, and a one-color Goss. The two four-color Robinsons are equipped with antifriction bearings, allowing greater sustained speeds and an increased oven drying capacity over the original Robinson press. This improvement permits use of a greater variety of ink solvents, as well as greater speed of operation. The last press installed is being equipped with a hole puncher and a sheeter.

Latest addition to the gravure printing department of the Kalamazoo Vegetable Parchment Co. is this Robinson four-color press. Shown with machine is installation and maintenance crew

Mexican Trade Pact Will Be Voided

The State Department advises that the Reciprocal Trade Agreement with Mexico, negotiated in 1943, may, after three years of negotiation, be voided by this country. In 1947 Mexico unilaterally decided to cancel all the concessions it had made in its duty rates on American merchandise, including several grades of paper.

Pending international discussions this country continued to grant the concessions it made under this agreement, despite Mexico's decision to cancel its reciprocal grants to the United States. It has taken three years for Washington to put the so-called escape clause of the Mexican agreement into effect, according to Warren B. Bullock, manager of the Import Committee of the American Paper Industry.

Stone Container Building Fabricating Plant in Mansfield

A new fabricating plant is under construction for Stone Container Corp. at Mansfield, Ohio. Situated between the firm's two paper mills in Coshocton and Franklin, Ohio, the plant, for which no opening date has yet been determined, will occupy approximately 50,000 sq. ft. on an eight-acre plot.

The new division was designed for maximum efficiency by Chicago architect F. Paul Birk; contractor is Simon Small and Sons Co., Mansfield.

Containing modern structural developments, the building will be one story with outside walls of red brick; inside walls of brick and tile will minimize fire danger, as will concrete floors and steel sash windows. Other fire control equipment will include a sprinkler system supplied with water from an overhead tank and a deep-well pump. As in Stone Container's other fabricating divisions, paper waste will be removed from floors and machines by suction pumps.

Corrugating equipment will be of the most modern types, equipping the plant to manufacture all types of corrugated containers and specialties of corrugated paperboard.

Container Corp. Whse. that Survived Chicago Fire now Destroyed

The North Pier terminal warehouse of Container Corporation of America, Chicago, was completely destroyed by fire on April 22. Loss including paper stock has been estimated at $750,000.

The five-story brick structure was erected in 1869. It was one of the few structures that survived the great fire in 1871, and during that holocaust, it is said to have served as an aid station for survivors.

Strathmore To Install New Paper Gauges

New electronic gauges for measuring the thickness of paper will be installed in the West Springfield and Woronoco, Mass., mills of Strathmore Paper Co. Just ordered, it is uncertain when the gauges will go into operation.

The new equipment will operate on electronic principles much the same as gauges and other equipment are operated, and will be used to measure the paper as it comes off the rolls at the mills. If paper thickness should increase or decrease the device will automatically give a signal which will stop papermaking machinery. The new gauge is reported to be far superior to those now in use.

MEMBERS OF THE BOARD of directors of The Mead Corp., Dayton, Ohio, visited the Macon Kraft Co. at Macon, Ga., on April 7. Officials of the Mead company, which controls the Macon firm, were conducted on a tour of the plant and woodlands in the area, attended an informal luncheon given in their honor, and held a formal business meeting before leaving the same day.

ONE CONDITION, generally overlooked in studies of the extent to which Scandinavia can come back into the field of exports of pulp to the United States and the rest of the world is that cutting of Scandinavian forests is under strong Government control. These areas were heavily overcut during the war, and the production of pulp is limited to the amount of wood which the Governments permit to be taken from the forests during a period when efforts are being made to get forest areas restocked to a perpetual yield basis.

PLANS ARE BEING considered by Sherman Paper Products, Newton Upper Falls, Mass., to establish a branch factory in Chicago. Purpose of the new plant, the third in the Sherman group, would be to enable the firm to give Midwestern and Southwestern clients much more rapid delivery of products.

The SMALLEST photographic reproduction ever published

of the LARGEST *ASTEN* Felt in America

. . . 8360 square feet of it!

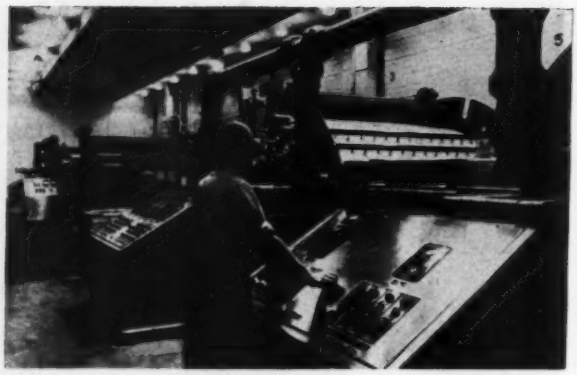
Photo—Courtesy of National Container Corporation

Here you get a glimpse of the 228" x 440' ASTEN Dryer Felt now running on the First Bottom Wet End of a Board Machine in the National Container Corporation's plant at Jacksonville, Fla. "One beauty of it," the Superintendent reports, "is the glue-and-rivet seam that we can put in it, and have no down time for repairs during the life of the felt. This is from six to seven months—at an average cost of 6 cents per ton of board."

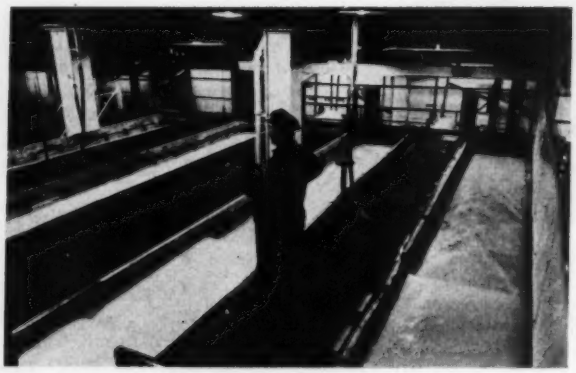
ASTEN-HILL MFG. CO.
PHILADELPHIA, PENNA.

ASTEN-HILL, LTD.
VALLEYFIELD, QUE.

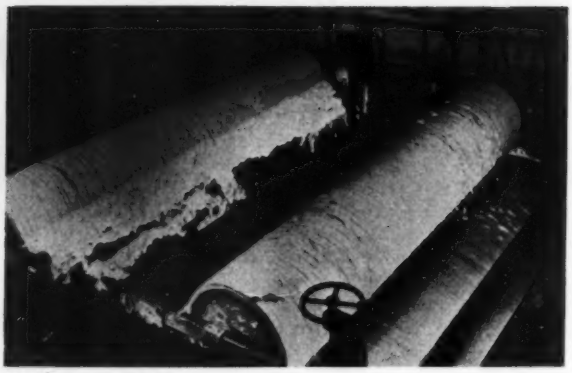
Consistency regulator and Sherbrooke stock meter



Sherbrooke washers with individual control panels

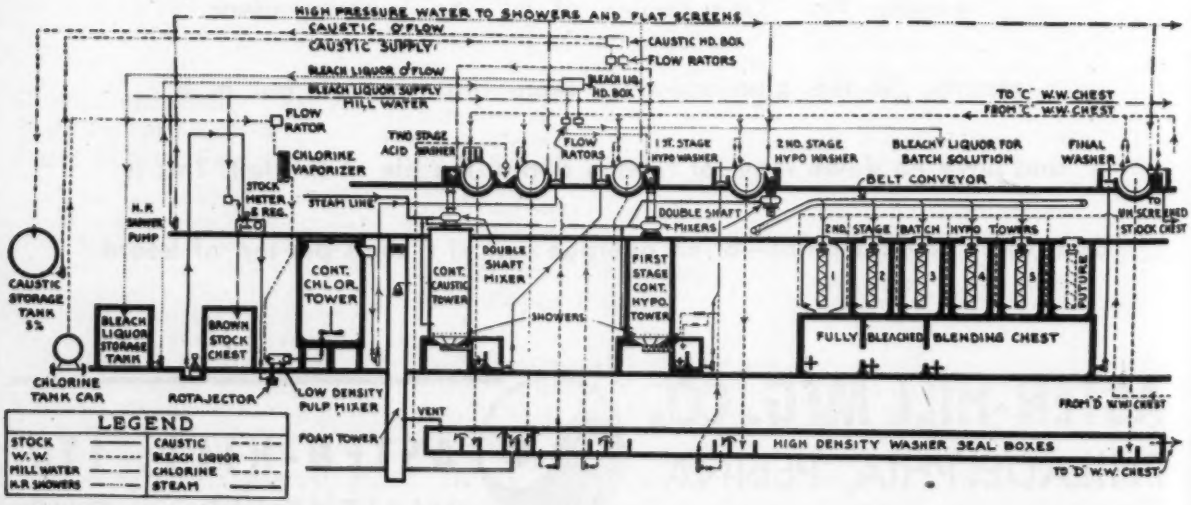


Four lines of Smythe flat screens with SS plates

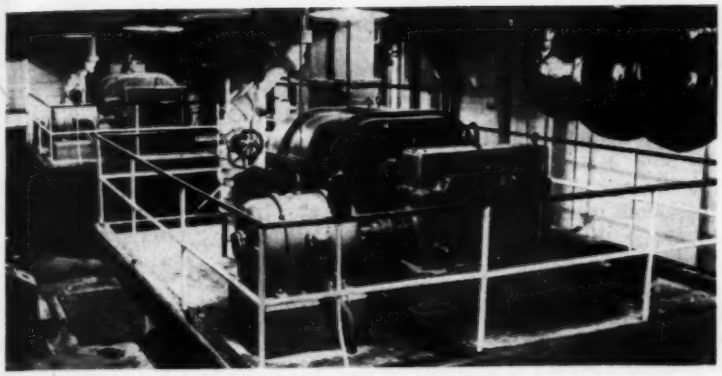


Bleached pulp deckers

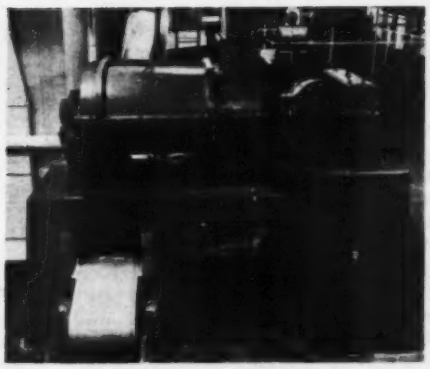
New Sulphite Bleachery



Flow diagram of 5-stage bleaching



Double-shaft mixers on top of continuous caustisicizing and hypochlorite towers



Mixer and belt conveyor to final stage towers

80-inch Kamyr machine

74-inch Oliver Rogers wet machine

at E. B. Eddy Company, Canada

▶▶▶ ONE OF THE MOST modern and efficient sulphite pulp bleacheries in Canada went into operation when the switches were thrown and the valves opened in the new bleached sulphite plant of The E. B. Eddy Company at Hull, Quebec. The completion of this plant represented only the most recent stage of a growth in equipment and facilities that has marked the progress of this company since its founding in 1851.

Company policy has insisted on a steady improvement in the quality of its many paper products, and the successful application of this policy has resulted in a demand for their products which has taxed plant capacity to the limit.

This led to the installation of the first unit for the production of 15 T.P.D. of bleached sulphite pulp, which consisted of a single-stage Wolf Fletcher hypo bleacher installed in 1925. This unit soon proved quite inadequate to supply the Company's requirements of bleached pulp. In 1937, therefore, a new 3-stage batch bleachery, designed by Pulp Bleaching Corporation, and having a capacity of 45 tons of bleached pulp per day, was brought into operation. Later, the capacity of this bleachery was increased to 75 tons per day, but by 1947 the bleachery was again inadequate to satisfy the requirements of the grades of paper then being made, and to meet the increase in consumption of bleached pulp caused by the acquisition of the former J. R. Booth mill in 1944.

In order to be able to supply the total quantity and quality of bleached sulphite now required by the paper mills, the Company decided that a new bleachery was needed. During the period 1937 to 1947, considerable advances had been made in the method of bleaching sulphite pulp, and it was decided that the most modern process and equipment should be incorporated in the new bleachery. To meet all the Company's immediate requirements of bleached sulphite pulp, it was found that the bleachery would have to have an initial capacity of 120 tons of bleached pulp per day, and in order to be able to take care of possible future demands, that it should be capable of bleaching at least 150 tons of pulp per day. The new bleachery was designed for five stages. At the same time, all equipment of the existing bleachery which could be utilized, was incorporated in the new plant. It was found that, by converting the chlorinator from batch to continuous operation, it would have sufficient capacity for the new system, and that the existing high density batch bleachers could be used

in the final hypochlorite stage if two more batch towers were added.

The new bleachery was, therefore, planned as an extension to the existing plant, utilizing most of the existing bleachery equipment in the new layout. The extension of the existing buildings and use of existing equipment imposed some limitations on the design of the new plant, as it was necessary to maintain existing floor levels, and the location of several items such as the existing chlorinators, bleach towers, and stock chests had to remain fixed.

As it was essential to maintain the output of bleached sulphite from the existing bleachery until the new plant could take over, this point had to be taken into consideration in designing the layout of the plant, and in deciding upon the process flow. Some careful planning was required to accomplish a smooth transition.

Windowless Building

The modern building housing the bleachery is of steel frame construction with reinforced concrete floors, a Haydite roof and glazed surfaced 12-inch Speedtile walls, a type of construction which has been standardized in all Eddy Company bleach plant buildings. These walls are devoid of windows since their elimination has been found advantageous in reducing maintenance costs, resulting from corrosion of frames and sash.

The bleachery went into full operation early in 1949, and on occasions it has exceeded its present rated capacity. It is producing a bleached sulphite pulp of high brightness and cleanliness, which already has made its important contributions to increasing further the quality of The E. B. Eddy Company's many lines of fine papers.

Preliminary work on the design of the new bleach plant was carried out by the Company's own engineering staff: A. N. Ball, chief engineer; Fred Wrangell, assistant chief engineer; Tom Foulkes, steam and power engineer; and Ralph Hollebone, architect.

Detailed design was completed by Stadler, Hurter & Co., consulting engineers, under John MacArthur, project engineer. Contractors were The Foundation Company of Canada Limited under Frank Mullins, field superintendent.

Operating personnel of the new bleachery is: C. B. Davies, pulp superintendent; W. F. Wiggett, sulphite superintendent.

Bleaching Process

The sulphite bleaching system finally adopted consisted of five stages, four continuous stages, and one batch stage (see flowsheet page 156) as follows:

(1) Continuous Low Density Chlorination
(2) Continuous High Density Caustic Treatment
(3) Continuous Low Density Caustic Soak
(4) Continuous High Density Hypochlorite Bleach
(5) A Final Batch High Density Hypochlorite Bleach

By-passes were provided for each stage in order to facilitate start up and maintenance, and also in order to obtain the maximum amount of flexibility in the number of stages that could be employed to get a pulp grade of the desired degree of brightness and purity.

After some discussion, it was decided to make the final hypo stage a batch operation, as it was felt that this would result in closer control of the final brightness of the pulp, and because it meant that the three existing batch towers could be retained.

Later it was decided to omit initially the caustic soak stage, and one existing washer, which was scheduled to be relocated for this stage, was not used.

The rate of flow of stock through the continuous stages of the system is controlled by a combination unit consisting of a DeZurik consistency regulator followed by a Sherbrooke stock volume meter, mounted in a common tile vat.

Chlorination Stage

One of the two existing chlorinators 17 ft. diam. x 30 ft., concrete tile lined, was converted from "batch" to "continuous upward flow" by the installation of a Pulp Bleaching Corp. rubber lined agitator and overflow discharger supplied by Waterous Limited. Chlorine gas in introduced into the pulp in a Sherbrooke rubber lined single shaft chemical mixer, located at the base of the tower.

The chlorinated stock at 3 per cent consistency after 1 hour retention time overflows from the top of the tower, and is pumped at 0.75 per cent to a double unit Sherbrooke washer-thickener, white water dilution being added to the stock in the pipe line on its way to the washer. The pulp is washed in the acid phase, the first washer, 8 ft. x 10 ft., being a rubber covered unit equipped with washing showers and submerged repulper. The second unit is 8 ft. x 12 ft., rubber covered and chrome nickel steel, and is equipped with washing showers and two rubber covered press rolls.

The pulp discharges from this unit at 16-18 per cent consistency. Caustic is applied to the sheet by a drop pipe located ahead of the shredder and screw conveyor which discharges the pulp to the caustic stage.

Caustic Stage

The shredded pulp, soaked with caustic, drops from the screw conveyor into a Sherbrooke double shaft pulp mixer, where steam is added to raise the temperature to 120 F. to obtain the desired degree of caustic treatment. The pulp at 12 per cent consistency discharges from this mixer directly into the top of the steel, tile lined, high density caustic tower, 12 ft. x 32 ft. At the base of the tower, after two hours retention time, the pulp is diluted to 8-10 per cent and withdrawn continuously from the tower by a Sherbrooke High Density Tower Scraper and Metering Screw into an agitated dump chest where dilution is added to reduce the stock to pumping consistency of 3 per cent. The stock is washed over a Sherbrooke, cast iron, washer-thickener, 8 ft. x 10 ft., equipped with washing showers and two press rolls, and having a shredder and screw conveyor discharge.

Caustic Soaking Stage

This low density continuous stage which has initially been omitted from the bleaching system, will utilize the existing second batch chlorination tower, 17 ft. x 30 ft., and existing batch inter-stage washer, 8 ft. x 6 ft.

1st Hypochlorite Stage

Calcium hypochlorite bleach, and caustic soda to control *p*H are added by drip pipes to the sheet leaving the caustic washer before the shredder, and the shredded pulp drops into a Sherbrooke double shaft pulp mixer and from there at 12 per cent consistency, and 90 to 100 F. directly into the high density bleach tower, 12 ft. diam. x 32 ft., concrete, tile lined.

The mechanical equipment for this tower is a duplicate of the caustic tower equipment, but as this is the end of the continuous system, the dump chest capacity was made as large as space would permit, to provide surge capacity between the continuous and batch operations.

The pulp washing equipment is a duplicate of the caustic stage.

2nd Hypochlorite (Final) Stage

Calcium hypochlorite bleach is added to the sheet as in the previous stage, and the shredded pulp is discharged into a high density pulp mixer. From the mixer, the pulp at 12 per cent consistency falls on to a 24-inch rubber belt conveyor, from which it is ploughed off at any one of five points to feed the present five batch towers, 11 ft. diam. x 20 ft., concrete, tile lined. In order to be able to discharge to all five batch towers from this conveyor,

the conveyor rises at a fairly steep angle to a height of 8 feet above the batch tower charging floor. The whole conveyor structure was built in reinforced concrete, and the belt rides in a tile lined trough, arranged for water lubrication of the underside of the belt. The discharge ploughs were designed to be operated hydraulically, and the controls are located conveniently near the chute to the individual towers. The plough lies at an angle of 45 deg. to the belt, and is designed to pick up rather than scrape the pulp off the belt, and discharges it to chutes at the side of the belt. When not in operation, the plough is swung about to a horizontal axis clear of the belt, and is held in this position by a counterweight. In the operating position, the same counterweight holds the plough against adjustable stops, to control the blade pressure on the belt.

The positioning of the plough is thus made positive in either operating or raised position, and is not dependent on water pressure. A definite pull from the hydraulic cylinder is required, either to raise or lower the plough.

As the headroom under the conveyor is limited, the return belt is not enclosed, and is supported on return idlers. To eliminate any possibility of pulp crumbs carrying back on the return belt, a brush roll was installed near the head pulley, which effectively cleans the conveyor belt, and any pulp carried over is dropped automatically into the last tower.

Batch Towers

The batch towers consist of three existing Pulp Bleaching Corp. high density circulating towers, and two new duplicate towers, the rubber lined equipment for which was supplied by Waterous Limited. A third new tower was provided but not equipped, and this will only be put in operation should the plant capacity be increased.

All five batch towers dump into a common agitated dump chest, which was obtained by cutting through the walls separating the three original individual dump chests.

The batch towers are dumped after 4¾ hours retention time by flushing out the stock with white water. In order to secure some control over the consistency in the dump chest, the total quantity of water used to dump each bleacher is controlled by a flow controller which shuts off the flushing water after a predetermined amount has been used.

From the dump chest, the stock is pumped up to a Sherbrooke rubber covered washer, 8 ft. x 10 ft., which is the last operation in the bleachery proper, and then discharged into the bleached unscreened stock chest.

Miscellaneous Equipment

All towers are of reinforced concrete construction, except the caustic tower, which is steel, and all are lined with Stebbins tile linings.

All the washers are set in tile vats, tile lined, below the floor line and Semtile above the floor, also supplied by Stebbins.

All stock pumps are Canadian Allis-Chalmers single suction open impeller stock pumps in Niresist, except the chlorinated stock pump, which is rubber lined. All white water pumps are Canadian Ingersoll-Rand double suction closed impeller pumps, also of Niresist construction.

In the bleachery, Armco rubber lined pipe, supplied by Goodrich Rubber Co., was used throughout. In the screen room and wet machine room, all piping is Armco welded steel pipe Lithcoted inside and out, supplied by R. F. Walsh and Co. The headboxes, flowboxes and stock spouting are of fabricated steel, Lithcoted both inside and outside.

It was originally thought that no further screening of the pulp would be necessary after bleaching, as the stock had been thoroughly screened before bleaching. But in order to obtain the highest quality and cleanest pulp, it was found necessary to remove some of the fine heavy dirt particles entering the stock during the bleaching stages. This type of dirt has been traced to impurities in the bleaching chemicals and wear of the tile linings and pointings in the bleach towers and stock chests.

Screen Room

The screening equipment consists of four parallel lines of screens, two 14-plate Smythe Flat Screens per line, with 0.007 cut stainless steel plates, supplied by Hydro Turbine Co. Limited, followed by three Sherbrooke cylinder deckers, 49 inches x 132 inches in Lithcoted steel vats. Space was provided for the future installation of two additional lines of flat screens, and one additional decker.

The flow boxes from the screens to the deckers are so arranged that all three deckers may operate on accepted stock, or alternatively, for selective screening, one or two deckers may operate on primary accepted stock, and the others on rejected or overflowed stock from the primary screens.

The stock is discharged from the deckers into either of two stock chests, which in turn supply the wet machines.

Wet Machine Room

The existing 72-inch Oliver Rogers wet machine remains unchanged, and is connected to run on unscreened or screened bleached stock, depending on screen room operation producing 40 T.P.D. oven dry at 28 per cent dryness.

A new 80-inch Kamyr wet machine supplied by Paper Machinery Limited, was installed to lap the increased tonnage of bleached pulp; i.e. 80 T.P.D., and is connected up to run on screened bleached stock only. This wet machine is a standard Kamyr wet machine consisting of a 79 in. diam. vacuum cylinder mould, 1st high pressure feltless press (H-600) 48 in. predryers, 2nd high pressure feltless press (H-700) and wet lap slitter and cutter. Size of sheets is 2-36 in. x 40 in. wide. A Nash L-6 vacuum pump, 25 hp., 860 rpm, V-belt drive, 440 cfm, maintains a vacuum of 15 inches Hg.

Consistency of the stock to the Kamyr machine is controlled by a Brammer consistency regulator. Broke is repulped in a small 6 ft. Hydrapulper located on the Kamyr machine floor. To facilitate start up of the Kamyr machine, this Hydrapulper was located temporarily on the floor below, so that the web from the vacuum cylinder could drop directly into the pulper.

Materials Handling

The pulp from the cutter with 54 per cent moisture drops into cutter boxes, and is piled by hand by one man on pallets for transport to the Company's paper mills about one mile away. The standard pallet load is 3,000 lb., which piles over 5 ft. high on the mill standard 36 in. x 48 in. pallet. To reduce the labour of piling to this height, the cutter was set 3½ ft. above the floor, and a simple but effective pallet handling system installed, consisting essentially of an hydraulic hoist, an air pusher and a dead roll storage conveyor, all supplied by Williams and Wilson. In operation, the hoist carrying the empty pallet is raised to a height convenient to the operator. As the load builds up, the pallet is gradually lowered to maintain this piling height. When the full load has been piled on the pallet, the hoist is lowered to rest against stops on the floor. The air pusher is then used to push the loaded pallet off the hoist onto the inclined roller storage conveyor and the cycle repeated. Labor for the Kamyr machine is two men per shift.

From the storage conveyor, the pallets are handled by fork lift truck over the scales to the storage and shipping floor.

Pulp pallets are loaded on to special large trailer trucks, or into the Company's own railway cars for shipment to the specialty mills in Ottawa or Hull, respectively.

The layout of the existing bleachery was a controlling factor in the layout of the new extension.

The three existing batch bleachers

which were to be used for the final hypochlorite stage, were controlled from the operating floor of the existing bleachery. The three additional towers were, therefore, built alongside them, and so located that they could be filled from a common belt conveyor and discharged into the same existing chest. The operation of filling, circulating and dumping these towers is controlled from the old operating and charging floor, and all the necessary instruments and controls are grouped on a new panelboard.

Layout of Equipment

All other operations of the bleachery are controlled from the washer floor above; the instruments and controls being divided according to function. The main panelboard controls the main process flow-stockmeter, chemical flows, steam flows, etc., while individual stainless steel console panels control the operation of each washer and auxiliaries such as pumps, agitators, valves, etc.

A complete description of the instrumentation of this bleachery will be found in Mr. Henry Gordon's paper, "Instrumentation of The E. B. Eddy Bleach Plant," presented at the annual meeting of the Technical Section of the Canadian Pulp and Paper Association in Montreal, January, 1950. [*Abridgment of Mr. Gordon's paper will appear in an early issue of this magazine.*]

Washer Location

On the top floor of the new bleachery extension, in addition to the main operating control panels, are located all the interstage washers and the final washer. The washers are set up in line, in two blocks of three units each. The first block consists of the chlorinated stock double washer and the caustic stock washer. The second block consists of the two washers following the first and second hypochlorite (final) stages of bleaching, with a space left for the soak stage washer, which was not installed.

All washer vats are of concrete construction, tile lined, and are sunk into the floor so as to bring the top of the vat below normal eye level. The console washer control panels are mounted alongside the individual washers, and so arranged that the operator can observe the operation of the cylinder mould and the vat level from the operating position at the panel.

One end bay of this floor is separated from the washer room by a full tile wall, and is used as the electrical control room, housing the main switchboard and the motor converters for the variable speed d-c motors driving the washer cylinders, the stock meter and the discharge screws of the high density towers.

The heating and ventilating equipment for the bleachery is also located in the same bay on a mezzanine floor above the electrical control room.

The next floor down is the old bleachery operating floor extending into the new building. At one end of the new floor are located the pulp conveyor to the batch bleachers, and the drives and inspection openings of the new batch towers. The high density caustic and hypo towers are located in the same part of the building, but it was necessary to carry these towers to 6 feet above floor level. High density stock mixers are carried on a slab forming the top of each tower. The high density stock mixer for the stock going to the batch towers is carried on a concrete foundation straddling the pulp conveyor.

At the other end of the building extension is the new bleached stock screen room, equipped with 6 lines of flat screens, and 3 deckers. The layout provides for the addition of two more lines of flat screens, and one additional decker in the future.

At the next floor down, the building is divided.

The half containing the towers has no floor at this level, while the other half has a floor at the elevation of the existing wet machine room floor, carrying the new wet machine, which was installed to lap the additional production of bleached pulp. The floor below this area is used for storage and shipping of lapped pulp. The basement of the entire new building contains the stock and white water chests, dump chests; the drives for the high density towers, stock chest agitators, and pumps.

General Features

The washer floor ventilation was designed to eliminate any need for hoods. A false ceiling was installed over the washer room, above which are placed the exhaust and supply ducts. The stainless steel exhaust duct is located over the center line of the washers, while the two air supply ducts are placed close to the walls on each side of the building. The incoming air is blown vertically downwards through high velocity louvres, close to the side walls, and follows a U-shaped path down the walls and up the centre of the room to the exhaust dust. This system effectively carries off all the vapour from the washers, and a certain amount of fresh air short circuiting which takes place has maintained a dry ceiling.

All control cabinets and d-c motors are separately ventilated.

The washers are of the vacuum type with drop legs discharging the effluent into seal boxes of hollow tile construction. The seal boxes overflow, and are vented into a foam tower, 6 ft. diam. x 63 ft., of hollow tile construction.

The foam tower discharges into a new tile lined sewer provided with a Parshall flume for measuring water, chemical and fiber losses. All white water is reused, except from the chlorination stage, which is sewered.

The washers and high density tower discharge screws are driven by Reliance variable speed drives.

Compressed air for the bleachery instruments and valve operation is supplied by a separate new Canadian Ingersoll-Rand air compressor, 7 x 7 ES-1, 89 cu. ft. per min., V-Belt driven by a 20 hp. motor.

A 4,000-lb. capacity Otis-Fensom semi-automatic passenger and freight elevator serves all five floors of the bleachery extension, and is designed to carry pulp pallet loads in case of breakdown of the freight elevator. The bleachery proper used 42,000 gallons of screened water per ton of pulp, 4,100 lb. of steam per ton, and 21 hp. days per ton. Labor required to operate the bleachery consists of three men per shift, apart from control chemists. The screen room requires an additional man per shift.

Chemical Storage

The existing chlorine car unloading and calcium hypo bleach making equipment did not have to be changed, as these were found to be quite adequate for the new operations. However, a complete new system of caustic storage and dilute caustic liquor preparation was installed. Two externally heated and insulated caustic steel storage tanks each having a capacity of just over one tank car were installed for the storage of 50 per cent solution of caustic soda. Dilution to 5 per cent is carried out by a batch system, the 50 per cent caustic being pumped to a measuring tank, and then discharged into a measured volume of water in the mixing tank. The dilute caustic is then discharged by gravity to the dilute caustic storage tank, which has a capacity providing approximately 18 hours storage. With the exception of the dilute caustic storage tank, all the caustic equipment is housed in a separate building. Control of the dilution system is located outside this building, the necessary meter, gauges and push buttons being concentrated at one point, and operated by the bleach maker who normally works for two shifts only. The large dilute caustic storage tank was installed to provide a supply of dilute caustic solution to the bleachery during the night shifts, and no additional labor is required to operate this system.

How To Protect Meters From Harmful Fluids

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▸▸▸ IN PRACTICALLY every industry there exists one or more processes employing liquids or gases of such nature that they can not be passed directly to the measuring element of a pressure gauge or a differential pressure type flow or liquid level meter. Most of these fluids can be measured by employing some means that will seal the instrument from the fluid proper and at the same time transfer the measured pressure or differential pressure from the point of measurement to the sensitive element within the instrument. Other fluids require special type instruments such as flow meter bodies with sealed armatures, or area type flow meters.

Most fluids presenting measuring problems can be classified in general groups according to their troublesome characteristics. It is recognized, of course, that certain fluids may fall within two or more of these groups. In such instances consideration of the individual factors involved will aid in arriving at the simplest and most practical method of handling.

Types of Problems

Corrosion—Many fluids such as sulphuric, hydrochloric, and nitric acids chemically attack the instrument or connecting piping causing deterioration of the sensitive parts. This leads to erroneous instrument readings and eventual failure of the measuring system. The rate of corrosion varies, but even in cases where corrosive action may be slow, it is sufficient to gradually alter the instrument calibration.

Precipitation—Fluids such as lime slurries, unclarified green liquor and black liquor contain solid particles in suspension. Where agitation is present, this usually gives no trouble, but in the instrument and connecting piping where the fluid is stagnant, these particles settle out, building a considerable deposit and causing clogging of the instrument and connecting piping.

Volatile liquids and gases containing condensable vapors—Flow and liquid level instruments of the differential pressure type can function correctly only if they are able to measure accurately the differential pressure existing between the high and low pressure taps. Obviously, this is possible only if the static head or pressure in the piping connecting both sides of the meter body to the pressure taps is equal and constant.

Highly volatile liquids such as light hydrocarbons tend to vaporize in the meter body and connecting piping, and since this evaporation is not likely to be equal on the high and low pressure sides, the head of liquid on the meter body will be altered thus introducing an error into the meter readings.

Gases containing condensable vapors cause similar trouble because of the change in head resulting from uneven condensation in the meter body and connecting piping.

Explosive fluids—Many liquids, vapors, and gases of an explosive nature present no metering problem insofar as instrument operation is concerned, but they must be sealed away from the instrument because of the likelihood of injury to personnel and process equipment should leaks in the connecting piping or in the instrument itself result in an explosion. This factor is of particular significance when the instruments are mounted in a master control room.

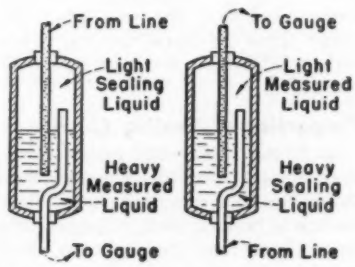


Fig. 1 Liquid seals

Highly viscous liquids—When metering liquids such as heavy oils and concentrated black liquor, the major problem involved is clogging of the connecting piping and instrument. The solution to this problem lies in the use of some means of sealing the liquid from the instrument or in the use of a special type instrument designed primarily for handling highly viscous liquids.

Liquids that congeal or solidify at room temperature—Some liquids such as molten salts, waxes, and Dowtherm solidify at room temperature, while others such as paraffin, gelatin, and latex, tend to coagulate or congeal at critical temperatures which are generally above room temperature. Since measuring instruments and connecting piping are normally at or very slightly above room temperature, it is evident that special handling is essential to satisfactory instrument operation. It is necessary either to take steps to maintain the substances in liquid form while approaching and entering the instrument, or to seal the liquid from the instrument at a point in the process line or equipment where the temperature is sufficient to maintain the substance in the liquid state.

Foaming liquids—Some liquids tend to foam excessively in the connecting piping and meter body of a differential pressure type flow or liquid level instrument. Since foam consists of part liquid and part gas, this condition can cause a varying or unequal static head on the meter body with consequent irregularities in instrument readings. When this type liquid is being handled, provisions should be made to keep the connecting piping and meter body filled with either gas or liquid.

Methods of Handling

Special methods for handling liquids of various types include: (1) liquid seals, (2) condensers, (3) gas and liquid purge systems, (4) the area type meter body, (5) the meter body with sealed armature, (6) diaphragm seals, (7) bellows seals, (8) steam jacketed meter body, and (9) settling chambers. The method used, of course, depends on the fluid being measured, it being necessary in some cases to use a combination of two or more of the systems listed.

While seals and other special handling methods are often necessary in the measurement of certain process fluids, the use of these methods should be confined to those applications where an actual need exists. Seals, purge systems, and similar devices should be employed only after a careful analysis of the application at hand justifies their use, since a measuring system which includes these special handling methods usually requires more maintenance than the average straightforward instrument installation.

Liquid Seals

Liquid seals are used with spiral, bellows and helix actuated pressure gauges, and with differential pressure type instruments for measuring flow and liquid level. These seals may be used to: (1) protect the spiral, helix or meter body from the corrosive action of the fluid being measured, (2) pre-

vent heavy viscous fluids from entering the measuring system, (3) maintain constant heads on the high and low pressure sides of the meter body when fluids containing condensable vapors are being measured.

For differential pressure type instruments—The liquid seal comprises an enclosed pot or chamber with suitable connections to the point of measurement and to the meter body or pressure measuring element. When employed with a differential pressure type instrument, two seals are required, one in the high pressure line and one in the low pressure line. Although three fluids are involved, namely: (1) the fluid being metered, (2) the sealing liquid, and (3) the mercury in the meter body, they are, for all practical purposes, incompressible, and the system functions as though the seals were not present. The sealing fluid thus transmits the measured pressure differences to the mercury without changing or distorting them in any way.

The same sealing liquid must be used in both high and low pressure seals since the use of two liquids having different specific gravities will cause the static head on one side of the meter body to differ from that on the other side, a situation which will introduce a meter error. With the instrument at zero reading, the heads of liquid on both sides of the meter body should be equal. The characteristics of the sealing liquid, including its specific gravity, should be known so that these factors can be taken into account when the meter body and orifice plate calculations are made.

For pressure gauges — The liquid seal used with spiral, bellows, or helix actuated pressure gauges is similar in principle to the seal employed with differential pressure type instruments. In this case, however, only one seal pot is required. The manner in which the seal is installed depends upon whether the sealing liquid is lighter or heavier than the fluid being measured.

Two methods of utilizing a standard seal pot plus added internal piping as a pressure gauge seal are shown in Figure 1. In one instance, the sealing liquid used is lighter than the measured fluid and consequently fills the upper portion of the seal pot. The heavier measured fluid fills the lower portion. The piping arrangement inside the seal pot is such that only the sealing liquid will be transmitted to the measuring element of the pressure gauge.

It is apparent that an increase in line pressure will transfer a greater volume of sealing liquid to the measuring element, thus altering the head of liquid within the seal pot which must be acted upon by the measured pressure. Since these changes in head, caused by changes in the level of the interface in the seal pot, affect the value of the pressure indicated or recorded by the instrument, the seal pot should be designed so that changes in the level of the interface will be small over the entire range of the seal.

The second system utilizes a sealing liquid which is heavier than the measured fluid, and consequently fills the lower part of the seal pot, the upper part being filled with the measured fluid. Piping connections are, of course, reversed; the line from the gauge enters the top of the seal, while that from the main flow line enters the bottom.

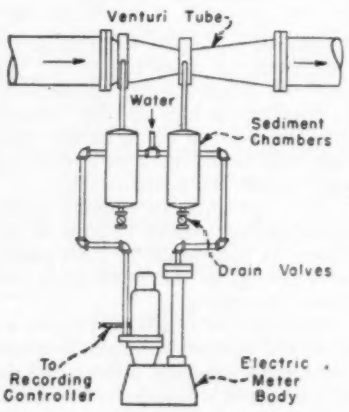


Fig. 2 Water purge system for slush pulp

Properties of Sealing Liquids

In general, the specific gravity of the sealing liquid should be greater than that of the fluid being measured. Since the meter body is usually located at a point lower than the seal pots, it is simply a matter of connecting the piping from the flow line to the top of the seal pot and that from the meter body to the bottom, providing the specific gravity of the sealing liquid is greater than that of the measured fluid (see Figure 1). If the specific gravity of the sealing liquid is less than that of the measured fluid, the piping must be reversed, i.e., the piping from the flow line connected to the bottom of the seal pot, and that from the meter body to the top.

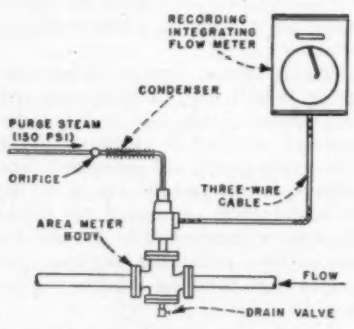


Fig. 3 Area meter for black liquor

The latter arrangement is objectionable primarily because of filling and balancing the system. With the arrangement illustrated, it is merely necessary to fill the meter body, connecting piping, and seal pot up to the level of the line connection. With the seal pots properly leveled, balancing of the high and low pressure legs presents no problem.

When the piping connections are reversed (sealing liquid specific gravity less than that of measured fluid) it is extremely difficult to obtain the same level of the interface between the sealing and measured liquids in both pots unless the seal pots are equipped with try cocks. Moreover, when the sealing liquid is poured into the pot, it is almost impossible to eliminate some mixing of the two liquids.

Wherever possible, the specific gravities of the sealing liquid and the measured liquid should differ materially so that a definite layer or interface will be formed. When these specific gravities are nearly the same, there is more tendency for one liquid to diffuse into the other, thus defeating the purpose of the seal.

Miscibility an important factor—The sealing liquid must not be miscible with the mercury nor with the fluid being measured. In some cases where it is desirable to use a sealing liquid that is miscible with the measured fluid, a double seal can be employed. In this type system, two seal pots and two sealing liquids are used. The pot which is connected to the flow line is filled partially with measured fluid and partially with a sealing liquid which is not miscible with this measured fluid. The second pot, which is connected to both the first pot and the meter body, is filled partially with the sealing liquid used in the first pot, and partially with the second sealing liquid, which also fills the connecting piping and the corresponding leg of the meter body. The piping connecting the two seal pots is also filled with the first mentioned sealing liquid.

Chemical action and freezing and boiling points important—A sealing liquid must not react chemically with mercury nor with the measured fluid. Its freezing point must be low enough to insure against freezing of outside meter connecting lines during the winter. Its boiling point must be sufficiently high so that the liquid will not volatilize and escape through the main flow line. Moreover, if the meter piping is not installed in such a manner that it will be self venting, any highly

volatile sealing liquid would have a tendency to fill the meter body legs with a mixture of liquid and vapor, a condition which would result in inaccurate meter readings.

Several of the more commonly used sealing liquids are shown in the accompanying table which also lists their specific gravities and freezing and boiling points. The miscibility and chemical activity of these liquids with various process fluids, if not already known, must be determined experimentally.

Condensers

Essentially, a condenser is a form of seal pot or constant level chamber. They are used when the meter and piping are filled with condensate. They must be employed wherever the condensable vapor being measured tends to transform from a gas to a liquid.

When measuring the flow of steam or Dowtherm, for example, condensation will occur in the meter body and connecting piping, since these parts of the measuring system are normally at temperatures considerably below that existing in the main flow line. Unless condensers are installed in such a system, this condensation is likely to cause unequal static heads on the two sides of the meter body, thus introducing a measuring error. With condensers properly installed, constant static heads are maintained at all times.

It is essential that condensers be installed properly, otherwise a measuring error will be introduced. They must both be installed on the same level since both condensers and connecting piping are filled with liquid and any difference in the level of the condensers results in a difference in the liquid heads on the two sides of the meter body.

Purge Systems

The purge or feedback system is suitable on many applications involving the measurement of fluids which are corrosive or which contain solids in suspension. It is especially useful where no suitable liquid seal can be found, or where an excessive amount of suspended material is present and settling chambers are impractical. For example, certain highly corrosive gases permeate all sealing liquids. They either attack the sealing liquid chemically, or dissolve in it, thus forming a liquid which is as corrosive as the gas itself.

Other process fluids such as slush pulp in paper mills, and mash and grain slop in distilleries contain such high percentages of suspended materials that sediment chambers, if used, would fill up so rapidly as to be impractical. Even where a purge system is employed, it can be used in conjunction with seal pots or settling chambers to provide an additional factor of safety.

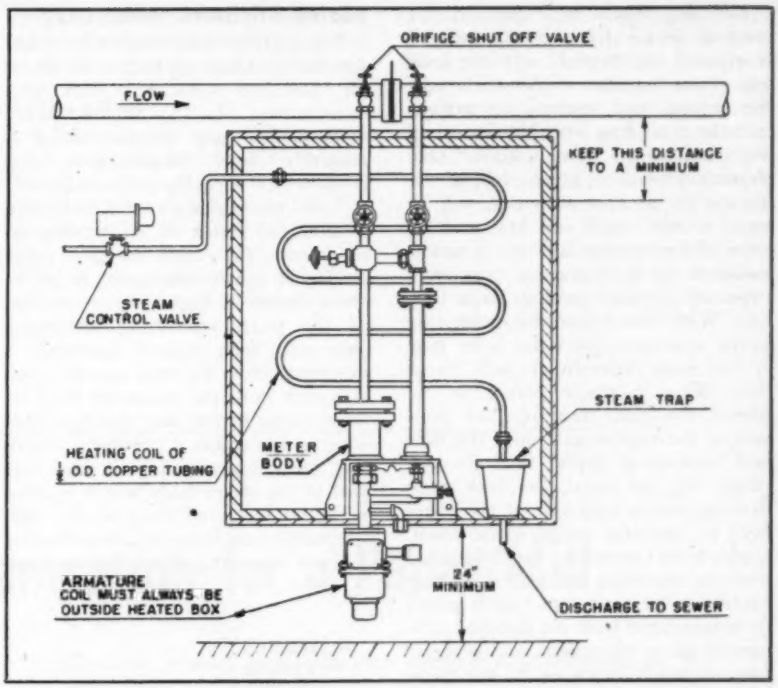


Fig. 4 Sealed armature meter body

Installation and operation of purge or feedback system—As shown in the illustration (Figure 2) of a purge system applied to the flow measurement of pulp stock, the system bases its operation on the fact that a flow of fluid introduced into the seal pots or connecting piping at a constant pressure slightly above that in the flow line causes a small but constant flow of purging fluid into the flow line, thereby preventing the measured fluid from entering the system of piping and seal pots (when used) connecting the high and low pressure taps to corresponding sides of the meter body. The purge system used with a pressure gauge would resemble one-half of the system just described, that is, one indicating flow gauge (usually a rotameter) one needle valve and (where required) one seal pot and/or sediment chamber.

Liquids Commonly Used As Sealing Mediums

Composition	Specific Gravity at 60 F.	Freezing Point, deg. F.	Boiling Point, deg. F.
Prestone (Ethylene Glycol)	1.116	+ 1	387
Prestone & Water (50% Water by Volume)	1.071	−34	
Glycerine	1.260	+64.4	554
Glycerine & Water (50% Water by Volume)	1.130	− 9.4	
Glycerine & Water (75% Water by Volume)	1.062	+19.2	
Prestone & Water (75% Water by Volume)	1.038	+10.0	
Alcohol, Ethyl	0.793	−179	173
Alcohol & Water (50% Water by Volume)	0.976	−33.8	178
Kerosene	0.820		423
Carbon Tetrachloride	1.595	− 9	169
Mineral Oil (Nujol)	0.900		575
Naphtha	0.760		
Transformer Oil	0.876		
Gas Oil	0.863-20% A.P.I.		
Water	1.000	+32	212

Referring again to Figure 2, the purging liquid (in this case water) is injected continuously into the level pots from whence it flows through the piping and venturi connections into the stock flow line. Needle valves and indicating flow gauges (not shown) provide a means for adjusting the purge flow so that it will be equal to both high and low pressure sides of the system and at a pressure sufficient to overcome the maximum expected pressure in the main flow line. With this adjustment made, the purge system supplies the same flow at the same velocity to each purge line. When a purge system is employed, the meter measures back pressure at the orifice, and since the flow and velocity of liquid through each purge line are equal, the back pressure applied to each side of the meter body by the purge system is also equal. Under these conditions, the differential pressure caused by the orifice plate or venturi in the main flow line is added to or subtracted from the constant pressure of the purge system, and is therefore accurately measured by the meter body. In a purge system for measuring corrosive gas the purging medium consists of air or some inert gas such as nitrogen.

Area Meter For Viscous Fluids

The area type flow meter was designed primarily to handle the measurement of heavy, viscous fluids such as black liquor, pitch, tar, and heavy oil. As illustrated in Figure 3 the meter body is inserted directly in the main flow line, the measured fluid passing through it. A floating piston within the meter body is free to move vertically, the position which it takes up at any instant depending upon the rate of fluid flow at that instant. Piston movement caused by a change in the rate of flow of the measured fluid is transmitted electrically to a remotely located recording instrument.

This meter can be provided with steam jacketing or can utilize a small hot water purge as shown by Figure 3 in the arrangement for measuring the flow of concentrated black liquor. As indicated, steam at a pressure of approximately 150 psi is passed through a small orifice (about 0.006 inch) and then through a condenser comprising a one-foot length of ¼ inch finned copper tubing. The resulting hot water purge is piped into the top of the meter body. The amount of purge water required will, of course, vary with the fluid being measured. In the case of black liquor of 33.5 deg. Bé. gravity to 170 F. with a maximum flow of 20 gpm, a total of 20 gallons of purge water a day provides satisfactory meter operation.

Sealed Armature Meter Body

The electrical meter body with sealed armature is often applied to minimize the problems associated with flow measurement of: (1) highly viscous fluids which must be maintained at relatively high temperatures, (2) fluids which vaporize and would tend to form gas pockets in the measuring system, (3) fluids of a corrosive nature, and (4) high melting point fluids such as salts which melt at 300 F.

As shown in Figure 4, the portion of the meter containing inductance coils and float-actuated armature, is mounted below the float chamber and is sealed from the measured fluid by the mercury in the float chamber. This construction makes it possible to maintain the connecting piping, and that part of the meter body which is filled with the measured fluid at the high temperature necessary to insure fluidity without exceeding the operating limit

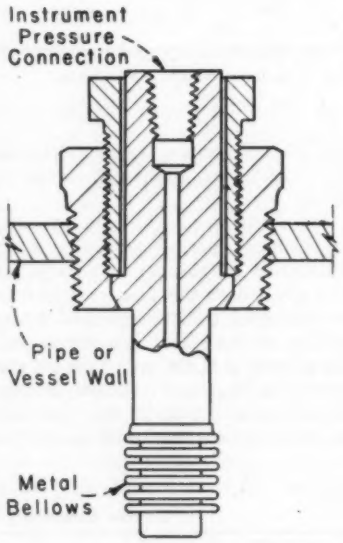


Fig. 5 Bellows seal

of the inductance coils. In the application shown, the meter body and connecting piping are installed in an insulated box which is kept at a high temperature by means of steam coils. Since the inductance coils and armature project outside the box, they are not affected.

Any corrosive fluid, such as hydrofluoric acid, which does not adversely affect mercury or carbon steel, can be admitted directly into the meter body since the inductance coils and armature are effectively sealed from the measured fluid by the mercury in the meter body.

The meter body is self-venting since the high pressure connection is centrally located above the float chamber. In the measurement of volatile liquids such as propane, butane, and other light hydrocarbons which tend to vaporize and which are difficult to seal, any gas or vapor formed in the meter body can escape through the connecting piping to the main flow line.

Diaphragm Seals

Diaphragm seals are used primarily for two purposes: (1) to protect the pressure-sensitive element (spiral, helix, or bellows) of a pressure gauge from chemical attack by corrosive gases or liquids, and (2) to prevent suspended materials in liquids from entering and clogging the connecting piping to a pressure gauge used in measuring liquid level.

In a diaphragm seal, two fluid mediums (one of which is the measured fluid, the other the fluid filling the connecting piping and element of the pressure gauge) are separated by means of a diaphragm. Since one side of this diaphragm is exposed to the measured fluid, an increase in the pressure of this fluid will cause the diaphragm to be displaced in a direction away from the pressure source. This displacement will compress the fluid in the connecting piping and pressure gauge element, thus causing the latter to indicate an increase in pressure. A decrease in measured pressure results, of course, in reverse movement of the diaphragm, and consequently of the pressure-sensitive element in the gauge.

The diaphragm must be sufficiently flexible to insure movement upon small differences in pressure on either side of it, and to prevent any permanent distortion in either direction. For very low pressures, an extremely flexible diaphragm of natural or synthetic rubber is usually employed, while higher pressures require the use of very thin metallic diaphragms.

Factors affecting diaphragm seals—It must be remembered that the part of the system including the pressure-sensitive element and connecting piping comprises a pressure-tight liquid filled system which resembles the thermal system of a pressure-type thermometer. Large variations in the temperature surrounding this liquid filled system will therefore cause expansion or contraction of the sealed-in liquid which will be reflected in a change in the indicated or recorded pressure.

When liquid level is being measured, the pressures encountered are relatively small and a rubber diaphragm is used, the space between the diaphragm and the pressure-sensitive element being filled with air rather than liquid. In this case, the effect of ambient temperature on the system is not of any great importance. With a liquid-filled system,

however, a gauge is accurate only at the temperature for which it is calibrated.

All air must be removed from system—Accuracy cannot be obtained with a liquid-filled diaphragm type seal unless all air is removed from the system. This is true because air bubbles in the system result in the combination of compressible and non-compressible mediums. Consequently, movement of the diaphragm occasioned by an increase in measured pressure will cause an increase in pressure in the liquid-filled system which will be partially absorbed by the compressible air bubbles. The indicated or recorded pressure will then be less than the true measured pressure.

Bellows Seal

Bellows seals are advantageous where measured fluid tends to congeal. When the pressure of a fluid such as viscoe is measured, the bellows seal illustrated in Figure 5 is ideal for such applications. As can be seen, it consists primarily of a small sensitive bellows which is inserted directly into the flow line or storage vessel.

Variations in the pressure of the measured fluid will cause this bellows to contract or expand. The inner portion of the bellows as well as the connecting piping and pressure-sensitive element within the pressure gauge are filled with liquid. Consequently, as the bellows expands or contracts, it either decreases or increases the pressure within the liquid-filled system. These pressure changes are, of course, reflected in movement of the recording pen or indicating pointer of the pressure gauge.

Maintenance Organization for a Paper Mill

C. C. WINSTON
Senior Staff Engineer
Wallace Clark & Company

Growing interest in maintenance methods was reflected by the attendance at the first Plant Maintenance Show held in Cleveland in January. Mr. Winston gave the opening paper at the Conference on Plant Maintenance in which he discussed the principles of maintenance organization and management. Now, he has prepared several articles for THE PAPER INDUSTRY which elaborate and discuss various phases of maintenance management as applied specifically to the pulp and paper industry.

▶▶▶ IN PAPER MILL operation, maintenance is complicated by the variety of equipment required, and, in many localities, by an industry tradition which declares that Sunday is a day of rest—except for the maintenance department.

Although most of the product is made to customers' specifications, production runs usually are large enough that with the limited in-process storage capacity available, and the relatively short lead times, the manufacturing cycle actually approaches that in a continuous process industry.

Normally, operation of the paper machines is scheduled 24 hours per day, 6 days per week, with Sunday the only time reserved for shut down overhauls and repairs. In addition to strictly maintenance work during these shutdown periods, the maintenance forces are always asked to make equipment, pipeline, and other changes required for process reasons. Sometimes these changes are made at the expense of true maintenance work because the work load for maintenance mechanics exceeds the capacity of the available force.

The maintenance superintendent is faced with a continuing problem of marshaling his forces every Sunday to concentrate on shutdown work. He must give his men compensatory time off during the week. He usually is scratching his head looking for work which can be undertaken by his forces during weekdays when all of the product equipment is running.

The maintenance organization shown on Chart I works well for paper mills where the various operating departments are adjacent and the maintenance forces do not exceed 80 to 100 men. To balance the weekday and Sunday work loads, some basic principles must be observed:

(a) Periodic scheduled inspections of all equipment must be made by maintenance personnel. Job orders for all repairs should be initiated by maintenance.

(b) The work of all mechanics should be planned each day, a day in advance.

(c) Fifty per cent of the mechanic forces available during shutdown periods should be reserved for repair and overhaul work.

(d) Construction projects should be planned far enough in advance so that maintenance force can use this work for *fill in* load on weekdays.

Departmental Maintenance Men

Many mills have one or more millwrights or pipefitters stationed permanently in certain departments—paper machines, pulp digesters, groundwood, etc. The usual result is that these men lose their identity as maintenance men and gradually are *taken over* by the operating foremen. There are many arguments advanced for this type of decentralization, among them:

Travel is reduced, service is quicker

Less, or no, *paper work* is required on small jobs.

Mechanics become specialists on more limited types of equipment

I do not believe that this partial decentralization results in over-all economies in maintenance. If these men are considered as a part of the larger craft group, the routine adjustment and inspection work in these departments can still be carried on by these specialized mechanics on a tour basis. Jobs requiring more than 15 minutes of the tour man's time should be reported back and planned for mechanics from the central group. While this method requires more paper work, opportunity is provided for better distribution of work between departments and for better loading of the craftsmen. You can take advantage of the ¼ and ½ man-days which are usually lost when mechanics are permananetly stationed in departments. Maintenance work standards are higher and more uniform if the work is supervised by a maintenance foreman rather than by an operating man. Jobs beyond the

Chart I—Engineering and Maintenance

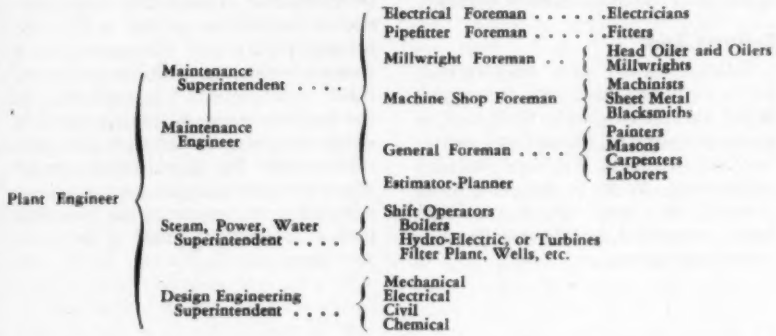
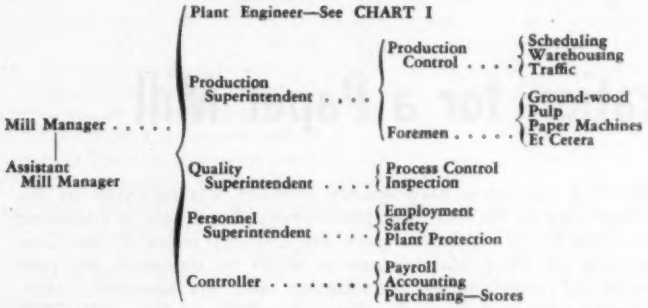


Chart II—Top Mill Organization



ability or capacity of the departmental men are not undertaken without adequate planning and preparation.

The Estimator and Planner

In many mills, the day-to-day planning of the work of the craftsmen is left to the foremen. Weekend shutdown work is usually co-ordinated through meetings and lists of work. More often than not these lists show all of the work which might be done, and load may bear little relation to the craft man-hours available. The result too often is extra overtime or delays in starting the paper machines.

The properly organized maintenance department removes the determination of what-work-should-be-done-when from the foremen, and places this decision in a maintenance planner. The estimator prepares estimates for each job order as it is received, and converts this work into terms of man-hours by craft and elapsed hours for the job. The planner, working with the maintenance superintendent and operating personnel, determines priority of work and schedules enough work each day to load all crafts for the following day. He looks ahead to shutdown work and insures that all possible preparations are made for this work during the week. This leaves the craft foremen free to supervise his mechanics, train them, and inspect their work.

The Maintenance Engineer

The maintenance engineer shown on the staff of the maintenance superintendent, concentrates on preventive maintenance and cost reduction. He establishes standards for types of lubricants, frequencies of lubrications, and inspections. He carries on a continuous review of the history and cost of repairs by item of equipment. He identifies instances of recurring maintenance and seeks improvement through redesign, replacement, or job method changes.

Lubrication

The head oiler should report to the millwright foreman. This concentration of responsibility for lubrication, inspection, repair and overhaul of all moving parts in the millwright foreman eliminates buck-passing and also strengthens the preventive maintenance program.

Maintenance Stores

In many paper mills, stores—including maintenance stores—are placed organizationally under purchasing. Electrical and mechanical spare parts always represent a large portion of the dollar inventory in stores. Sometimes purchasing (or accounting) attempts to exercise arbitrary controls to reduce this investment. The maintenance superintendent must have the final say on what items are to be stocked. Order points should be based on his estimate of usage and purchasing's estimate of replacement times. If this arrangement cannot be worked successfully because of conflicting views, or personalities, the maintenance superintendent and plant engineer must insist that maintenance stores be included in their department.

The Plant Engineer

Chart I shows the complete organization of the plant engineer's section. Steam, power, and water services are grouped under a superintendent. Operation of these services usually presents problems more closely allied with engineering than with manufacturing. Routine maintenance of this equipment is performed by the shift operators with overhaul jobs undertaken by the maintenance superintendent's forces.

Design Engineering

This section of the plant engineer's organization must be staffed with enough varied talent to meet conditions at the mill. Normally a large part of his work is of a design nature for building, equipment, and services additions or alterations made necessary by product changes.

The various engineers also act as project engineers to follow construction or rearrangement jobs undertaken either with the maintenance forces or by outside contractors.

The plant engineer must insure that equipment redesign problems for reduction of maintenance costs which are referred to the design section by the maintenance engineer receive prompt attention.

The Place of Maintenance

In order to insure that maintenance problems receive equal consideration with those of production, quality, personnel, and accounting, the plant engineer should report directly to the mill or works manager. (See Chart II). Too often, emphasis is placed on *production* at the expense of proper *maintenance*. Extensive building projects are undertaken and mechanics are *borrowed* from maintenance. Not enough equipment downtime is allowed for the maintenance department to perform necessary repairs and overhauls.

The plant engineer must have sufficient stature in the organization so that he can prevent any of these conditions from developing. What he needs in the way of supporting data to present the case for maintenance factually and correctly will be discussed in future articles.

Paper and Paperboard Making—III

HARRY WILLIAMSON

Be sure to read Mr. Williamson's "Questions and Answers on Beating" in the June issue. The subject of Hydration has been covered in three parts; the first two appeared in the March and April issues. Regular installments from the author's forthcoming book will appear each month.

Hydration—Part 3

The First Beating Process

In our search of the evolution of HYDRATION of fibers by BEATING, we have record of the use of flat sticks and the pestle and mortar. The first a striking blow or beating blow, the second more of a rubbing and pounding blow. Which came first and whether the beating was first used on fibrous matter of the inner bark of the mulberry tree or on the plant life fibers of flax or hemp is immaterial. The important fact, definitely known, is that a Chinaman named Ts'ai Lun is generally credited with making the first sheet of paper from fibers which had been BEATEN preparatory to forming them into a sheet of paper.

This momentous event occurred about the year 105 A.D., several hundreds of years after the making of the first sheet of papyrus by soaking in water and pressing the soaked mass into a sheet. In several parts of the world, notably sections of China, Japan and Siam, the beating of fibers to make paper is still carried on with both flat sticks and pestle and mortar methods.

Webster defines the pestle as "an implement, usually club-shaped, for *pounding* or *braying* substances in a mortar." The mortar is defined as "a strong vessel in which substances are pounded or rubbed with a pestle and (b) hence any similar mechanical device." This definition almost describes a beater tub with a revolving roll instead of a pestle. However, the beater tub did not arrive on the scene, as such, for 1650 years, and, of course, our authorative Mr. Webster many more years later than that.

Our ancient papermaker did have the club-shaped instrument and he did have a vessel in which to put fibers and water wherein to pound or rub them into a reduced particle size suitable to his purpose.

It is reasonable to assume that the growing demand —500 years from papyrus to paper—for a medium on which to write which could be rolled up an ' carried around more easily than papyrus led to the thought of using plant life growth which could be pounded or rubbed into individual fibers from which a thinner and more flexible sheet than papyrus could be made. Having used water as a softening agent for his strips of papyri, it is equally reasonable to assume that he realized the value of this same medium to minimize the amount of pounding and rubbing necessary to effect the reduction of the fibers to the size he wanted. It is entirely unreasonable to assume that he expected to create that condition of the fiber which we now call hydration. REDUCTION of the fiber was very probably the sole intent and purpose of using water as an aid to his pounding and rubbing. There was not, and could not be, any of the effect of hydration of fiber as we know it today available to his experience from his years of SOAKING and PRESSING his strips of papyri into a homogeneous sheet.

One experience he most certainly *did* have which may have guided him to the pestle and mortar reduction method and the fiber to use to make his thinner sheet. Hemp is a widely cultivated Asiatic herb; the tough best fibers of this plant growth among the very first fibers to be used for making paper. The flowers and leaves of this plant yield Hashish and Bhang, both narcotics and intoxicants when smoked, chewed, or used as a drink. The initial preparation of these intoxicants is a macerating pounding reduction of the flowers and leaves. Both of these narcotics were items of familiar use on the Asiatic Continent long before paper was made. The flax plant and bast fibers only of a more silky texture than the hemp fibers were known to our ancients who were familiar with the fact that these fibers could be freed from the parent stem by simply leaving the stems to rot on the ground.

How much his experience in making Hashish as compared to his visionary dreams caused by USING Hashish was contributory to the initiation of HEATING FIBER in the presence of WATER to make the FIRST sheet of paper is left to the discretion of the reader. In our modern era it is self evident that we papermakers, after personal imbibition of roseate influence of a liquid nature, become more revolutionary in ideas; even the question of hydration becomes completely settled. Unfortunately, there are as many settlements as papermakers in the party.

It is indeed doubtful that a deliberate beating of the stock was evolved to create this CONDITION of hydration as known, necessary pre-requisite of stock preparation to make paper. REDUCTION of fiber, NOT

cutting, NOT hydration, was in this writer's opinion the PRIMARY and ONLY objective of the ORIGINAL beating methods. Fibrils and the creation of fibrillae was INCIDENTAL to the type of fiber used; whatever hydration as we know it from our use of wood fibers, if any, was also incidental to the use of water as an aid to reduction. Whatever beating was done was FORMATION beating only and the TIME and MOTION of forming each individual sheet *could be changed* by the papermaker as he OBSERVED the formation of EACH sheet.

When we assess the known horsepower hours of the application of inch bar strokes per minute by a modern beater to produce this slimed or greasy feel condition on any of the seed hair family fibers with their natural high alpha-cellulose content, it is incredible to believe that any such condition of fiber could be arrived at with manual labor applied to the tools of beating available at that time or for many hundreds of years thereafter.

Our modern laboratory equipment for making hand mold sheets is equipped with a barometric leg with valve control to REGULATE the TIME RATE of formation. The object is to obtain a well formed sheet REGARDLESS of the hydration; slowness, or lack of hydration; freeness, of the prepared stock. This is necessary because all the hand sheets must be well formed or else subsequent tests made would not be comparable. We regulate the time rate of formation by the PULL of the speed of the water passing through the valve at the foot of the barometric leg.

In Siam the present day primitive papermaker, still making excellent paper by hand, has solved his own problem of time rate of formation without the advantage of our mechanical civilization. By digging a ditch from the bank of a flowing stream of mountain water, he diverts the flow and makes for himself a little tributary. The outlet of this ditch is controlled by a dam of sufficient height so that water can be impounded without flow. His hand molds, with horsehair woven for a drainage mesh, are laid on the surface of the impounded water and anchored to the bank. He pours his mixture of beaten fibers and water, at a very low consistency, into the molds. By lowering the dam at the outlet of the impounded water he causes the water to commence flowing and the pull of the flowing water starts the water flowing from the molds and formation is effected. If the sheets are forming too fast, free stock results; he then raises the dam a little and lessens the speed, and, therefore, the pull of the flow. A few hours of beating time more or less on the fibers with his beating tools means very little. He simply uses the dam as a means of control and GETS GOOD FORMATION.

In our modern papermaking we use revolving tube rolls in contact with the traveling wire mesh and by capillary attraction we also PULL the water through the mesh to effect formation, and by the combined use of the slices, the shake devices, the number and diameter of tube rolls used we control, within the operable limits of these devices, the TIME RATE of formation. On our modern cylinder type machines we LOWER or RAISE the level of the water INSIDE the revolving mold to control the rate of water flow through the wire mesh. Indeed, in PRINCIPLE there is no difference between the adjustment of the Siamese dam and the adjustment of the suction on a cylinder mold, BOTH essentially are adjustable to control the RATE OF SHEET FORMATION.

After 1000 A.D. the stamping mill was added to our beating tools and after another 750 years the Holland type beater, as we know it, was introduced. Each time or period the demand for paper increased beating instruments suitable to handle the available raw material in the locality in which the paper was made were invented to perform the work on the raw materials NECESSARY to meet the demand. The use of woven rags and the difficulty of reducing these rags to individual fibers was the necessity leading to the invention of this new method of beating. With this increased mechanical force available for beating purposes it is reasonable to assume that not only was demand kept up with for the moment but MORE STOCK was prepared than could be formed into paper by hand mold methods. At this point it was evidently a question of more molds or the invention of a method of FORMING the fibers into a sheet much faster than could be done by the hand mold method. The stock produced by the original Holland type beater must have been revolutionary in drainage time to the papermakers of that era for only fifty years elapsed and then the fourdrinier machine producing a CONTINUOUS SHEET, with relatively much greater production, was invented.

With the advent of the fourdrinier machine, the REASONS for BEATING changed. For the *first* time in paper making history the stock had to be BEATEN to meet the requirements of a MECHANICAL FORMATION UNIT.

No longer could the papermaker adjust his TIME and MOTION to the formation of each individual sheet; the paper machine, with its then crude and limited aids to formation was the controlling factor of HOW MUCH BEATING IN ADDITION TO REDUCTION must be given the fibers.

Through the next fifty years the fourdrinier machine was improved mechanically so that more and more production could be obtained, and as the speed of the paper machine was increased more and still more beating was given to the SAME TYPE OF FIBERS. More and more the stock was slimed up or made greasy simply and solely to provide the SAME quality of FORMATION as that made on the slower machine speed. There was still no question of making the paper to any strength test except the hand test and feel by the papermaker and the fibers were now beaten to a degree of slowness, or hydration as we now call it, never dreamed of in the making of hand made paper. This extra beating was for no other reason than that of meeting the mechanical necessities of the paper machine. The competition between the capacity of the fourdrinier machine against the capacity of the beating devices to produce the stock had commenced.

During this era a divided responsibility for the operating processes of making paper came into being. The BEATERMAN was the name given the man responsible for the stock preparation and the MACHINE TENDER was the title of the man responsible for running the machine. Theoretically, the machine tender was in charge and was considered the papermaker,

but more and more any variation in quality or lack of production due to machine breaks was traced back to variation in the beating of the stock or the paper machine running at a speed faster than the capacity of the available beaters to supply it.

The comparative figures on the beating work time necessary to develop hydration in fibers of the seed hair family and the wood fiber family will aid in understanding what is meant by hydration.

The papers selected for this comparison; one made from 75 per cent linen and 25 per cent cotton, the other made from 100 per cent unbleached kraft pulp, are both of the highest quality grade demanding carefully controlled operations. Both sheets were made in 1949, in different mills, and on modern equipment. In both mills Holland type beating was used to accomplish all the development work done on the fibers, a jordan for light cutting followed the beating and preceded the paper machine. This jordan was used by the machine tender solely as a unit of control over his formation. All beaters in both mills were equipped with recording charts to facilitate the proper use of the beater roll in accordance with the written beating instructions. As both mills specialize in quality grades in their respective fields all the beating equipment is maintained in first class shape; both are examples of modern papermaking by informed management supervising the operations of experienced and skilled papermakers.

For comparison, ream weight (24 x 36—500) of 44½ lb. for rag and 50 lb. for kraft were selected.

Furnish	Beater Capacity pounds	Per Cent Consis.	Beating Time (hours)	In-Put (hp.)	Hp. Hrs. (per ton)
75% Linen 25% Cotton	600	5½-6	18	45	2800
100% Unbleached Kraft Pulp	1500	5	4	100	732

For this work done the following strength values were developed. Note—the preference for small beaters by this rag stock mill is only indicative of the divergent opinions on the beating of stock; one of its competitors making exactly the same grades prefers a one ton beater charge with 200 horsepower in-put. Similarly, the mill making the kraft sheet prefers a full Holland type beating operation while their nearest competitor prefers pressure cycling jordaning. It is the difference of opinion which provides the excitement in a horse race.

Strength Values Developed for Horsepower Hours Work Done

Furnish	Ream Weight	Mullen Test (per cent)	Elmendorf Tear (per cent)	Perkin's Tensile (per cent)	Perkin's Stretch (per cent)
(75% Linen (25% Cotton	44½	107	247	34.29	3.28
100% Kraft	50	109	220	22.00	5.00

The strength figures are a unit of measure of the development of the stock. The development of the stock is the work done which we now call hydration. Hydration is the most controversial and important factor in modern papermaking. The inventive genius of mechanical application is now, in beating or stock preparation, falling behind the capacity of the papermachines. The Holland type beater sparked the development of the machine to make a continuous sheet of paper. The modern paper machine, as a mechanical unit could run much faster providing the beater room could supply the stock. It is time for another major move.

Hydration is that condition of the fibers developed by beating in the presence of water, which, on drying, exerts a contracting and compacting force. As the water of hydration evaporates, the fibers are pulled and held into an increasingly dense continuity.

The sheet made from linen and cotton shrank 6½ inches in width as it passed over the dryers. The sheet made from 100 per cent unbleached kraft pulp shrank 7 inches in width as it passed over the dryers despite the fact that it was 5½ lb. heavier in ream weight.

The fibers of the seed hair family group had natural fibrils and developed true fibrillae as an aid to density of formation and tear value. The wood fibers of kraft pulp had no such aid; merely braying and brooming of the fibers by beating. The higher tear value of the rag fiber is inherent in the natural length. The two sheets are so nearly alike in their developed values it may be stated as a fact that the degree of hydration developed by beating on these two widely opposite types of fibrous material for making paper is equal in both instances.

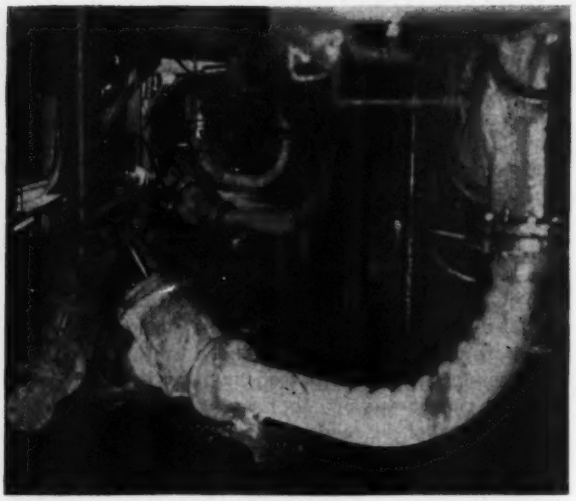
The fibers of the seed hair family required 2800 horsepower hours of work to develop a degree of hydration equal to that produced by 732 horsepower hours of work on the fibers of the wood family group.

The major difference between these two types of fiber is alpha-cellulose content; the seed hair family fibers are much more pure in cellulose content than the unbleached wood fibers. We know that as we bleach the impurities out of the wood fiber to make it the same refractive per cent power of white as the high grade rag sheet the wood fiber also then requires considerably more horsepower hours per ton to develop the same values. Moreover, the inherent values are partially destroyed by bleaching and we cannot actually develop the same all round total strength values on the bleached fibers that were possible of development on the unbleached fibers.

Many fine grades of paper which were formerly made from the seed hair family fibers are now made from bleached wood fibers. An increasing number of these grades do not require a high degree of hydration development; some of them require very little. It behooves us to seriously consider if we have TWO kinds of slimed, greasy, development by BEATING FIBERS IN THE PRESENCE OF WATER; one development from the PURE cellulose which requires a lot of beating time and one development from the IMPURITIES of the fibers which requires much LESS beating TIME.

As the USE of the wood fiber family is the THIRD MAJOR and RADICAL CHANGE IN the raw material source of supply in the HISTORY of papermaking, in this twentieth century we find the cycle complete; after 1850 years the methods of BEATING fibers are LAGGING behind the potential formation capacity of the paper machine.

Shades of Ts'ai Lun! I wonder what he REALLY did after he pounded up the flowers and leaves of the HEMP plant?



Long radius bend in 8-inch digester blow line and . . .

Short radius bend in air line are examples of how . . .

Wrinkle-Bending Aids Piping Installations

▶▶▶ WRINKLE-BENDING is a practical method for "tailoring" pipe to fit installations where standard stock fittings are either unsuitable or not particularly adaptable. It is especially useful where unorthodox bends are frequently employed and where re-routing of piping hookups requires complex bends to fit into existing piping installations. Requiring little special equipment, it provides the plant maintenance or piping department with an easy, economical means for speeding up many piping installations.

This bending technique has been used in pulp and paper mills in lines up to ten inches in diameter for handling such fluids as water, steam, compressed air, weak black liquor, brown stock, slush pulp, white water, clay slurry, rosin size, and chlorine. It is especially valuable for emergency piping where regular pipe bends are not readily available. Its convenience stems from the fact that it can be readily applied either to shop prefabrication or to bending pipe in position, depending upon particular job requirements.

As the name implies, wrinkle-bending is the formation of wrinkles or creases in the wall of a pipe to change its direction. It is a process of bending pipe progressively without the use of joints and without reducing wall thickness. Each wrinkle provides a small change of direction, usually less than 24 degrees. For short radius bends, the wrinkles are spaced closer together than for longer radius bends. Wrinkle-bending is applicable to small and large diameter piping and tubing, and to most grades of pipe except wrought iron and cast iron.

In application, the process consists of applying a steady, bending force while a narrow band of the pipe wall about two-thirds away around the pipe is heated to forging temperature, at the section where the wrinkle is to be made. The pipe wall is not thinned from its original thickness. Actually, compression squeezes the pipe so that the wrinkled metal is thicker than the original wall. The bend is smooth and regular and the tendency to flatten is not encountered in sizes below six-inch standard pipe.

A wrinkle bend of any degree may be readily laid out according to conventional pipe bending procedures. And regardless of com position, diameter, or wall thickness, all wrinkle bends are made essentially the same way although the rigs and devices used vary somewhat in detail. In all cases, the following requirements must be provided.

1) A positive means of applying steady and adequate bending force

2) A suitable means for holding and supporting the pipe

3) A carefully prepared layout legible on the surface of the pipe

4) Adequate means for uniformly heating to forging temperature the designated heat bands

5) Positive and accessible means for controlling the degree of bend

Below 2½ inch diameter, pipe can be wrinkle-bent with a shop vise and welding torch, but for larger diameters a bending rig must be used. Both procedures are illustrated here. Bending rigs vary in size and detail depending upon the size of the pipe to be handled, and whether the device must be portable for field operations. Furthermore, particular care must be employed when bending thin walled tubing and nonferrous pipe because of the tendency to collapse instead of to form wrinkles.

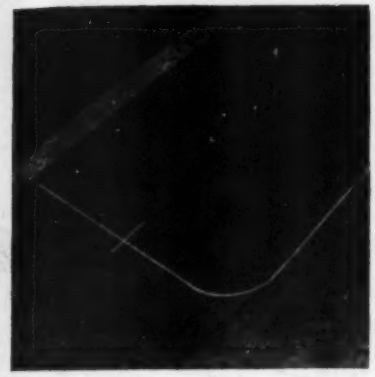
While wrinkle bending is simply and easily applied, unless the proper procedures are followed, unsatisfactory bends will be made. For instance, if too low a temperature is employed, premature and sharp initial bending occurs and often produces thinning, especially along the crown of the bend. If wrinkle bending is attempted at too high a temperature, injury and malformation may occur because of the extremely low strength of the overheated metal. If the pulling force is abruptly or unevenly applied, high and localized bending stresses are apt to cause deformations of the metal. If the pulling force is abruptly applied during the period of initial flexing, an off-sided localized bend may be produced.

Wrinkle bending should not be used on piping systems designed to carry substances that might deteriorate or become rancid if they become lodged in the internal troughs formed by the wrinkles.

Properly designed bends will withstand any normal line service without failure. Transmission efficiency of wrinkle bends is apparently equal to ordinary smooth bends. Since the wrinkles are on the inner radius of the bends, they do not disturb the flow at normal velocities. Loss of head is due mainly to wall friction on the outer radius as in the case of smooth bends.

Acknowledgment is made to The Linde Air Products Co. for the information and photographs used in this article.

How To Wrinkle-Bend Small Size Pipe



1—Lay out pattern on floor

2—Clamp in vise and mark off wrinkles

3—Heat a band about ¾ inch wide

4—Pull on pipe to form wrinkle

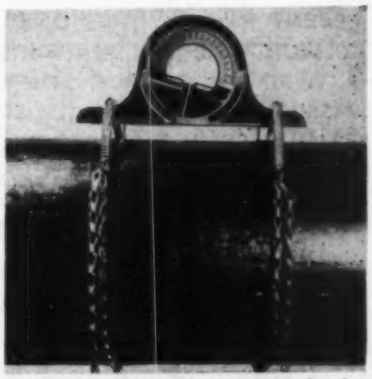
5—Permit cooling after each wrinkle

6—Check bend against pattern

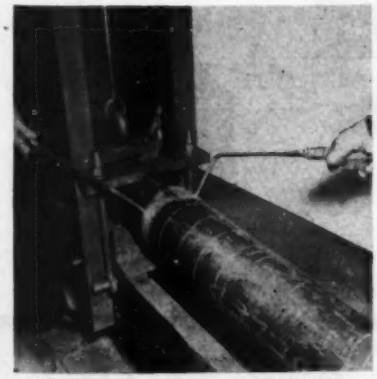
Larger Size Pipe Requires a Bending Rig

1—Clamp the pipe in position

2—Mark off the wrinkle positions

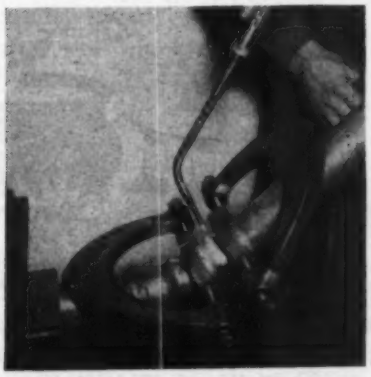


3—Mount protractor for measuring bend



4—Heat band two-thirds around the pipe

5—Winch provides steady pull



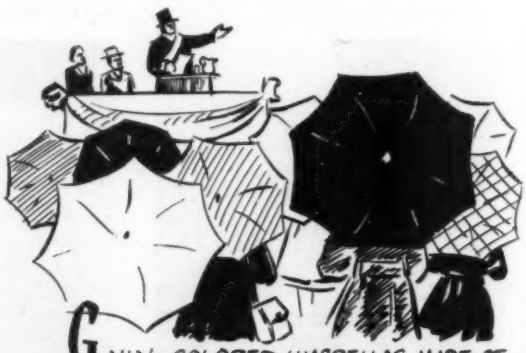
6—Nonferrous pipe requires clamps

PAPER SKETCHES

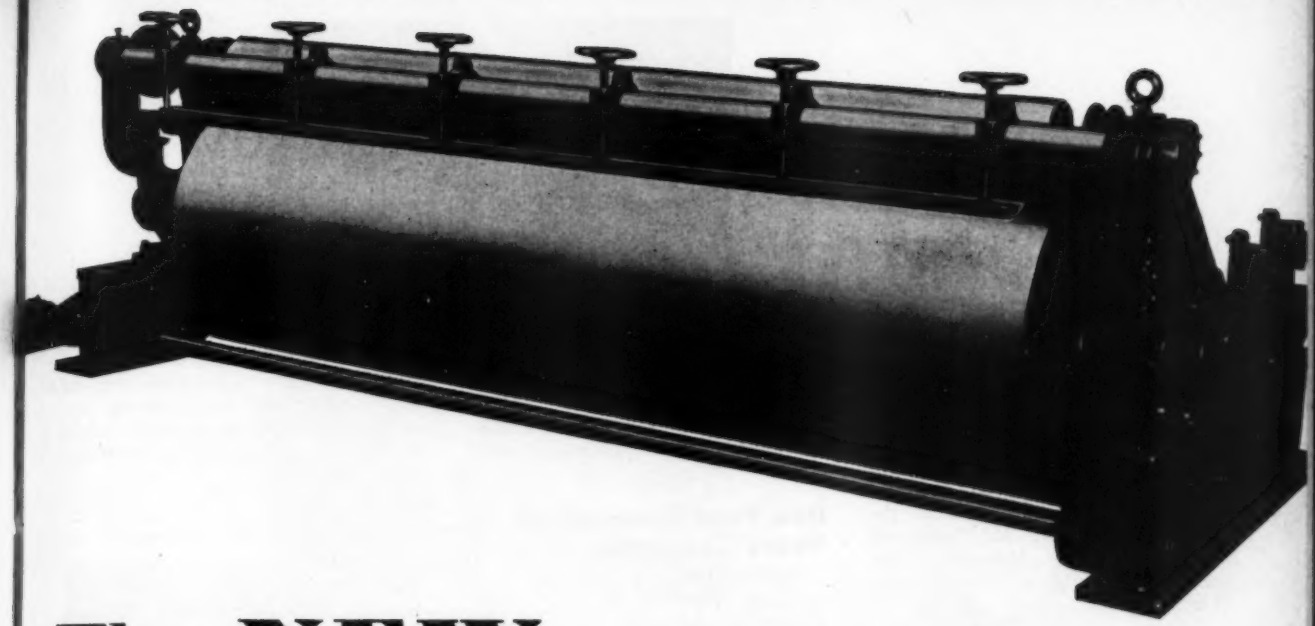
IN EARLY FABRIANO, ITALY, EACH PAPERMAKING OPERATION WAS CARRIED ON BY A DIFFERENT FAMILY. THUS, ONE FAMILY COLLECTED RAGS; ANOTHER SORTED THEM; A THIRD MADE "HALF-STUFF," AND PASSED THEM ALONG TO A FOURTH FAMILY WHICH BLEACHED THE PULP; A FIFTH FAMILY BEAT THE STUFF; A SIXTH MADE THE PAPER; A SEVENTH SIZED THE SHEETS; AND AN EIGHTH POLISHED THEM.

THE DRIED FLESH OF FISH, SOAKED IN A DILUTED SOLUTION OF BICHLORIDE OF MERCURY AND ALUM, ACTUALLY WAS TRIED OUT AS A MATERIAL FOR PAPERMAKING DURING THE PAPER FIBER SCARCITY OF 1870!

MORE THAN 50 YEARS BEFORE THE COMMERCIAL DEVELOPMENT OF THE SODA PROCESS, MATTHIAS KOOPS OF ENGLAND (ABOUT 1800) EXPERIMENTED WITH THE COOKING OF WOOD BY MEANS OF AN ALKALINE LIQUOR.



GAILY COLORED UMBRELLAS, MADE OF WATERPROOFED PAPER, ARE BEING MADE TO SELL FOR LESS THAN A DOLLAR.



The NEW AIR-OPERATED REEL

This air operated reel is definitely new! It was designed with ease of operation, accurate control and mechanical simplicity constantly in mind. Two small air valves are all the control required for the operation of the reel shaft position. With these valves, you can accurately control the pressure of the roll upon the drum. There are no hand wheels that have to be manually operated.

Tension being easily controlled you are assured of a uniform roll . . . with smooth winding from the start. Operators using this reel maintain it's exceptionally convenient to handle.

Write us about this new air operated reel and any other paper mill equipment you may need. We'll gladly give you the benefit of our 80 years experience in paper mill machinery manufacture.

BAGLEY & SEWALL

DESIGNERS AND BUILDERS OF PAPER MAKING MACHINERY

WATERTOWN, NEW YORK

Finland Representative
Aktiebolaget Ekstroms Maskinaffar
Helsingfors, Finland

Foreign Representative
Castle and Overton, Inc.
630 Fifth Ave., New York, N. Y.

The Paper Industry Allied News

Whiting Acquires Coburn-Foster Co. Conveyor Business

The belt and chain conveyor business formerly operated as Coburn-Foster Conveyor Co., Chicago, has been acquired by Whiting Corp., Harvey, Ill.

Headed by Gordon Foster, former president of Coburn-Foster, the new acquisition will serve to broaden the line of Whiting Corp. Mr. Foster will work under A. E. Bottenfield, vice president in charge of Whiting merchandise sales.

Conveyor equipment will be manufactured at Whiting plants at Harvey, Ill., and Los Angeles, Calif.

Du Pont Builds New "Orlon" Plants

Plans for construction of a new unit at Camden, S.C., for the manufacture of "Orlon" acrylic fiber in staple form have been announced by E. I. du Pont de Nemours & Co. even before the first unit of a new yarn plant there is completed. "Orlon" is the firm's newest synthetic textile fiber.

The new plant will be a separate unit constructed next to the plant now being constructed for the manufacture of "Orlon" in continuous filament yarn form. Research on the staple process is now being increased from a laboratory-scale operation to a pilot-plant operation at du Pont's Waynesboro, Va., research laboratory.

Link-Belt Establishes African Subsidiary

Upon the recommendation of its principal foreign representative, Eugene C. Burton, Link-Belt Co., Chicago, established on Jan. 27 a wholly owned subsidiary, Link-Belt Africa Ltd. The new branch will manufacture Link-Belt products in a plant near Johannesburg, South Africa.

Mr. Burton, formerly president and general manager of Link-Belt Ltd. in Canada, which he organized, is managing director of the new company. Other management heads will include John E. Petersen, formerly divisional engineer at the company's Pershing Road plant in Chicago, as chief engineer; Mr. Petersen and John Farley, president of Link-Belt Ltd., Toronto, are directors of the new organization. Edward L. Bateman (Pty) Ltd., will continue in the engineering and contracting capacities they have filled for Link-Belt for over 40 years, as will the firm's sales representatives, Bartles Constructional Equipment Co., Ltd.

Dow Plant Construction Nears Completion

Construction on a new Dow Chemical Co. plant at Freeport, Tex., planned for the production of latex, is progressing favorably, and should be completed by June 15. The Freeport plant is one of two new plants built by Dow for the manufacture of latex coating materials.

The Midland latex plant, site of latex manufacture for the past three years, was recently severely damaged by fire. Now being rebuilt, this plant should also resume operations about June 15.

Hardy S. Ferguson Co. Goes Out of Business

Announcement of discontinuance of the business of Hardy S. Ferguson and Co., consulting engineers, was released from that company's office on April 6.

The retirement of H. S. Ferguson is given as the reason for closing the affairs of the company, which has been in existence for the past 39 years at the address, 200 Fifth Avenue in New York City.

A CONTRACT HAS BEEN awarded by Stein, Hall & Co., Inc., New York to Turner Construction Co. for the erection of an addition to the plant of the Stein, Hall Co. subsidiary, Stein-Davies Co., Long Island City, N.Y. Construction of the five story and basement structure, 90 x 100 feet, with laboratory facilities on the fifth floor, has been begun, and is expected to be completed next October.

NEW YORK OFFICES of Raybestos-Manhattan, Inc., have been moved from 120 Broadway to 500 Fifth Avenue. The change was made to better serve company customers from the New York and New England district office of the company's Manhattan Rubber Division and the Corporation Export Department including Allied Asbestos and Rubber Co. At the same time, the firm's department of marketing and merchandising has been newly located at executive headquarters, 61 Willet St., Passaic, N. J.

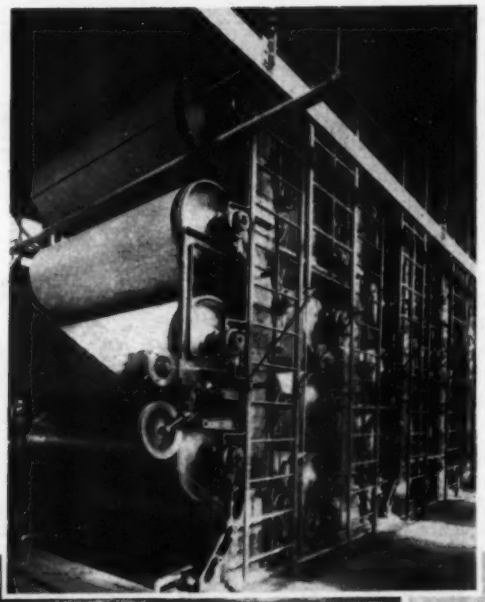
SPECIALIZING IN THE engineering and sales of alloyed and manganese wear-resistance steel casting, Werco Steel Co., 141 West Jackson Blvd., Chicago, has recently been formed by T. E. Bridgewater. Mr. Bridgewater, who has twenty years experience in this field, recently severed his affiliation with Kensington Steel Co.

CHICAGO OFFICES OF Samuel M. Langston Co., Camden, N.J., have been moved from 720 No. Michigan Ave. to 919 No. Michigan Ave. The telephone, MIchigan 2-2962, remains the same. Officials at the Chicago branch are Walter J. Goettsch, vice president, and A. G. Oberland, sales representative.

REPRESENTATIVE for The Moore & White Co. (Philadelphia) on the Pacific Coast is Dan E. Charles Agency, 1331 Third Ave., Seattle. The agency is headed by Mrs. Dan E. Charles. Arrangements were completed by Richard U. Temple, sales manager of Moore & White, while on a recent trip to the Coast.

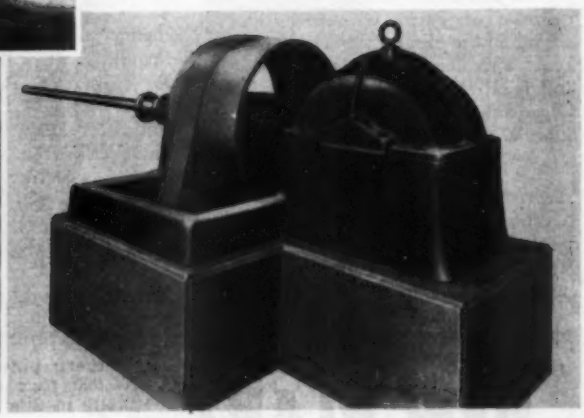
OFFICES OF THE Purchasing Agent of Cornell Wood Products Co., Cornell, Wis., will be moved to the Milwaukee plant of the company. L. E. Falbe, purchasing agent, will purchase for both mills, while H. R. Garbutt, who has been waste paper buyer since 1942, will devote his full time to production.

A PATENT HAS BEEN granted Drs. Lee D. Ough and John M. Newton of the research department of Clinton Foods, Inc., New York, for a new and highly improved method of treating corn starch to provide high uniformity and adhesive qualities in coating fine quality, high gloss papers.



DRYER MODERNIZATION

Sheahan rope carrier for safety and faster sheet carry over.



B-C spiral bevel gear drive for dryer sections.

B-C SEAMLESS DRYERS

Many thousands in service and failures negligible.

B-C BOLTED HEAD DRYERS

Mills that prefer this type will be accommodated.

Over the years, it has been the privilege of Black-Clawson to increase the tonnage of many a mill by enlarging its dryer sections.

Where machine room space was adequate, double and triple deck sections were often extended. When space was lacking and a building program threatened, old dryers were often mounted in vertical stacks and additional ones installed.

Perhaps a dryer modernization program would permit faster operation and greater tonnage at your mill. If so, Black-Clawson would be glad to estimate for you the cost of the improvement.

New machines, cylinder or Fourdrinier, rejuvenation of older machines. Finishing end equipment, drives etcetera.

THE BLACK-CLAWSON CO.
Hamilton, Ohio

DIVISIONS: SHARTLE BROS. MACHINE CO., MIDDLETOWN, OHIO • DILTS MACHINE WORKS, FULTON, NEW YORK

WESTERN SALES OFFICE: Mayer Bldg., Portland, Oregon

Associate: Alexander Fleck Limited, Ottawa, Canada

Subsidiary: B-C International, Ltd., 16 Catherine Place, Victoria, London S.W.1, England

The Paper Industry Association News

A FUNDAMENTAL RESEARCH Conference, sponsored jointly by the fundamental research committees of TAPPI and the Canadian Pulp and Paper Association, will be held May 29, 30, and 31, at the Chateau Frontenac, Quebec City. The meetings will include papers and discussions on the various aspects of the papermaking characteristics of fibers by authorities in the respective fields. Among the organizations contributing will be The Institute of Paper Chemistry, represented on the program by Merle Heath, J. A. Van den Akker, I. H. Isenberg and J. H. Herschleb, H. F. Lewis and Olga Smith, Loren V. Forman, and John W. Swanson.

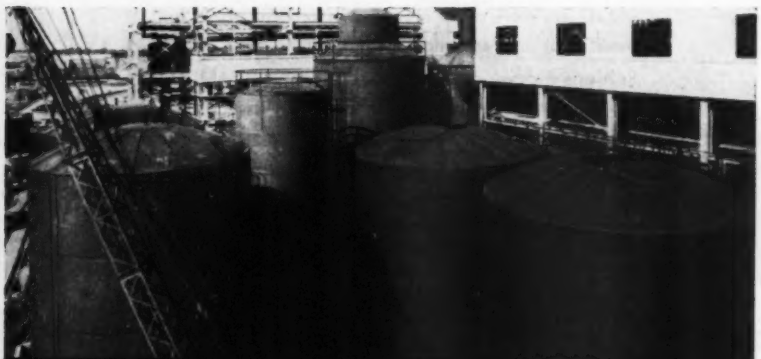
SENIOR OFFICERS AND management executives of American businesses will meet in New York June 1-2 to study strategic economic factors to be met by management in the coming decade. Sponsored by the American Management Association, this year's meeting is the 27th annual general management conference planned to effect an exchange of information among policy making executives.

TONAWANDA, N.Y., was the scene of the regular monthly meeting of the Western New York group of the Empire State Section of TAPPI. As guests of the Spaulding Fiber Co., approximately 50 TAPPI members toured the Spaulding plant before a dinner meeting held at the Prospect House in Niagara Falls, N. Y., at which the evening's speaker was E. A. Russell, chief engineer of the Spaulding firm. Mr. Russell, who chose as his subject "Conversion Products from Paper Material," was introduced by Norman Sixt, Carborundum Co. Irving Earle, Upson Co., Lockport, N.Y., presided over the meeting.

NEW PLANT TURNS PINES INTO PAPER!

Southern pines are made into 100,000 tons of newsprint annually in this huge plant of the Coosa Newsprint Co., Childersburg, Ala., shown under construction. Ingalls fabricated and erected the dozens of processing and storage tanks.

When you need fabricated steel work of any type, plate work, as well as structural, contact INGALLS, one of the nation's leading independent fabricators. Five plants, complete engineering staff. Write for information.



STRUCTURAL STEEL • PLATE WORK
STAINLESS STEEL • STORAGE TANKS
SHIPS • SHIP CONVERSIONS
BARGES • WORK BOATS

BIRMINGHAM TANK DIVISION
THE INGALLS IRON WORKS COMPANY
MAIN OFFICE: Birmingham, Ala.
Sales Offices in New York, Chicago, Pittsburgh, New Orleans

Coming Events

May 29-30—Joint meeting of TAPPI with the Technical Section of CPPA; fundamental research conference at Chateau Frontenac Hotel, Quebec. CPPA Technical Section Summer Meeting to be held at the Chateau Frontenac, May 31-June 2.

June 8-10—Annual meeting of the Superintendents Association, Edgewater Beach Hotel, Chicago.

June 8-10—Regional meeting, American Institute of Chemical Engineers, to be held at the Statler Hotel, Boston, Mass.

June 19-22—1950 Chemical Conference, Chemical Institute of Canada, at the Royal York Hotel, Toronto.

June 23-24—Joint Meeting of New England and Maine-New Hampshire sections of TAPPI, at Wentworth-by-the-Sea, N.H. Headquarters will be announced later.

Aug. 7-20—First United States International Trade Fair, to be held in Chicago.

Sept 5-9—Sixth National Chemical Exposition by Chicago Section of the American Chemical Society, at the Chicago Coliseum.

Sept. 11-23—Sixth Educational Graphic Arts Exposition, to be held at the International Ampitheatre, Chicago.

Sept. 13-15—Second TAPPI Testing Division Conference, to be held at Eastman Kodak Co. plant, Rochester, N.Y.

Sept. 15-16—Annual Fall Meeting of Northwestern Division of the Superintendents Association, at the Schroeder Hotel, Milwaukee, Wis.

Sept. 18-22—Fifth annual Instrument Conference and exhibit, sponsored by Instrument Society of America, Memorial Auditorium, Buffalo, N.Y.

Oct. 2-5—Fifth annual TAPPI Engineering Conference, Netherlands Plaza Hotel, Cincinnati, O.

Oct. 16-20—38th Annual Congress and Exposition of the National Safety Council, Stevens Hotel, Chicago.

Oct. 25-27—Alkaline Pulping Conference of TAPPI, at George Washington Hotel, Jacksonville, Fla.

Nov. 12-13—Fibrous Agricultural Residue Conference of TAPPI, at Peoria, Ill.

Etching, 1805, from the Bettmann Archive

"Take a Letter, Please!"

Centuries before the invention of shorthand and the typewriter, the public scribe was a familiar figure in the cities and villages of the Old World. He rendered a useful service, conducting business and family correspondence for those who could not write. Also, he could be counted on to have a few sheets of precious paper. In those days paper was scarce the world over, for it was all handmade. The miracle of modern paper making lay far in the future.

Today, writing and duplicating machines and plentiful paper are the indispensable tools of business—providing the most widely-used and most essential means of communication. And fine papeteries supply the most discriminating demands of social correspondence. Stationery is now a fifty-million-dollar annual business. Production and packaging of writing paper in its various forms constitute an important part of the great American pulp and paper industry.

The dramatic story of paper is told in the sound-and-color film, "Paper — Pacemaker of Progress," and in a book under the same title. Both are presented by F. C. Huyck & Sons as a tribute to the Paper Industry. The book will be sent free upon request.

F. C. HUYCK & SONS · *Kenwood Mills* · RENSSELAER, N. Y.

KENWOOD WOOL PRODUCTS

HUYCK *Felts*

The Paper Industry Safety News

One Employee's Quick Thinking Prevented A Serious Accident

A splendid lesson in accident prevention is contained in the following item from *Thilco News,* company magazine published by Thilmany Pulp & Paper Co., Kaukauna, Wis. The item and illustration are reproduced here with permission:

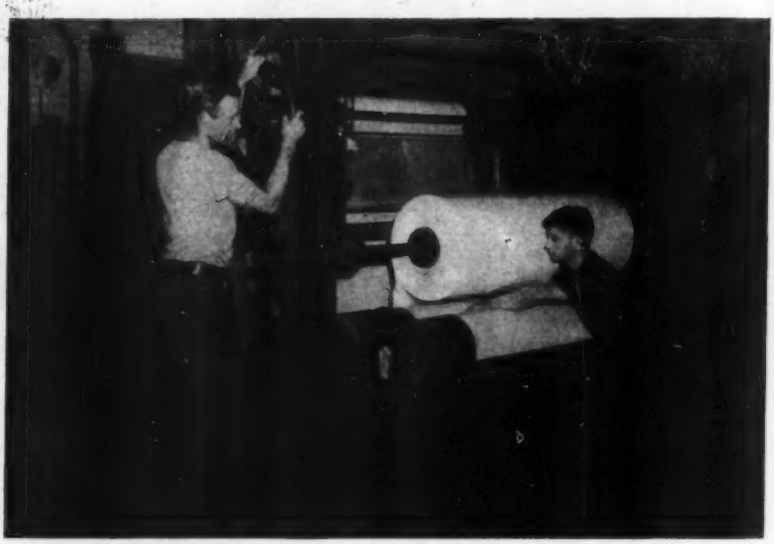
"That all-important safety device—alertness and clear thinking by safety-conscious employees—again 'paid off' in avoiding what may have been a serious or fatal accident in the supercalender department in December.

"Credit for avoiding the accident goes to Ben Hoersch whose quick thinking and action meant the difference between a slight injury and what might have been a serious accident. Perhaps the best compliment he could receive is an expression from Carl Hietpas, would-be victim of the mishap, who said, 'I can't express my appreciation, but I'm certainly thankful that a fellow like Ben was on the job when it happened.'

"Ben Hoersch (shown standing at the dampner counterweight control wheel on the accompanying illustration) was in the process of adjusting the machine when Carl Hietpas, spare hand, slipped and fell in front of the machine. In re-enacting the accident for our photographer, Carl demonstrates how his both arms entered the dampner between the mill roll and drums, after his weight had struck the guard release bar with enough severity to cause it to drop.

"Ben instantaneously released the pressure nip by turning the counterweight wheel and thereby eliminated contact between the roll and drum sufficiently to cause only minor friction burns to be inflicted on Carl's arms.

"In an effort to prevent a recurrence of the incident, new guards have been designed and installed which will greatly reduce the possibility of a similar accident. All supercalender steps and steel decks have also been treated with abrasive paint to prevent slippage."



Near-accident is re-enacted by Ben Hoersch and Carl Hietpas of supercalender department at Thilmany Pulp & Paper Co.

"Industries Safer Than Highway" says Paper Co. Safety Director

The application of industrial safety techniques and legislation in the home and on the highway was urged by Wilfred J. Desjardin, safety director of Kimberly Clark Corp., Niagara Falls, N. Y., at the recent Western New York Safety Conference.

Mr. Desjardin suggested the widespread use of industrial techniques of safety in view of the fact that "our industries are twice as safe as either home or highway." The conference president and chairman continued to say that progress has been achieved in the safety field in the past 50 years, but needs "practical laws—enforced and up to date."

Pulp and Paper Section Changes Name of Division II

At the last meeting of the Executive Committee of the Pulp and Paper Section of the National Safety Council, it was decided to change the title of Division II from Paper and Board Remanufacturing to Converting.

The change to the new name appears on the Section's monthly bulletin for March scores.

Bailey Electronic Instruments Work Here at the Lake Charles, La. plant of the Mathieson Chemical Corp.

Bailey Electronic Instruments Work Here at the Kodak Park plant of Eastman Kodak Co., Rochester, N.Y.

alkali OR FILMS

Bailey Electronic Instruments Work Here at the Chillicothe, Ohio Mill of the Mead Corporation.

Bailey Electronic Instruments Work Here at the Midland, Michigan plant of The Dow Chemical Company.

paper OR CHEMICALS

★ No matter what you process it will pay you to check into the Bailey simplified electronic control system.

With four basic circuits and eight basic component parts you can get more than 100,000 different electronic instrument and control combinations. Your problems of measuring and controlling flow, level, speed, pressure temperature, gas analysis, pH, conductivity, etc., can be solved by the right combinations of these 4 circuits and 8 basic parts.

You don't have to load up a stock room with parts. Bailey parts are interchangeable. What you used for the last combination is good for the next one when conditions in your plant change. You can save money, as others are doing, when you standardize on Bailey controls.

Bulletin No. 17 will show you how easy it is to install and use Bailey electronic controls. Write for your copy today.

●

you'll find Bailey Controls on the job

P-20

BAILEY METER CO.

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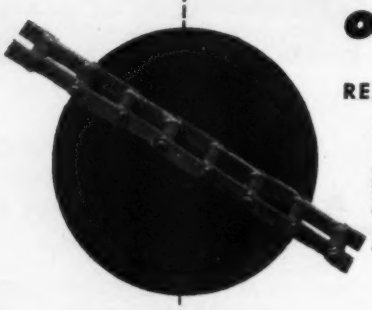
Bailey Meter Company Limited, Montreal, Canada

Controls for the Process Industries

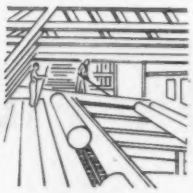
TEMPERATURE • FLOW • PRESSURE
GAS ANALYSIS • LEVEL • RATIO

Chain Facts

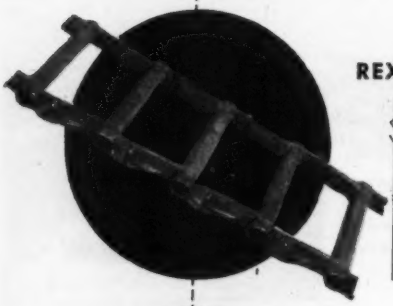
on REX pulp mill chains



REX COMBINATION AND DUROBAR CHAINS

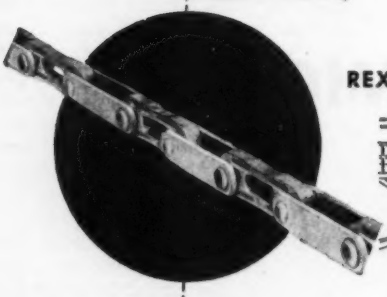


are husky chains with inside block links of malleable iron or Rex Z-Metal and side bars blanked from high carbon steel. Side bar pin holes are accurately punched for correct pitch and good drive fits. Milled flats on the ends of the pins prevent turning in the side bars and prolong chain life. Durobar Chains have reinforced outer barrel faces which eliminate rolling, grinding contact with sprocket teeth and thus reduce chain wear.

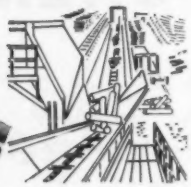


REX H-TYPE CONVEYOR CHAINS

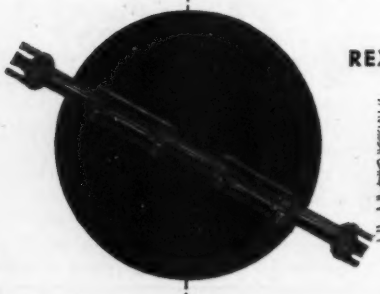
offer an efficient, economical means for conveying slabs, sawdust and other mill refuse. Operating in shallow troughs, these chains, because of their great width, offer the advantage of large capacity at low speeds. Chain links are one-piece castings. Inner barrel faces are designed for smooth operation over sprockets. Outer barrel faces are designed to act as scrapers. Wide wearing shoes, cast on the side bars, take the sliding wear, and vertical lugs reinforce and protect rivet ends.



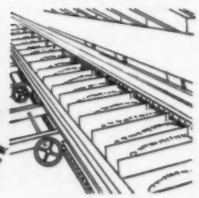
REX MILL REFUSE AND LOG CONVEYOR CHAINS



are stronger, tougher chains designed specifically for longer life under the pounding of logs and slabs. Alternating wide cast block links and steel side bar links combine rugged strength and a large sliding surface as well as maximum bearing area on the rivets. Cast block links are of heavy design, reinforced with two struts that provide a sturdy anchorage for scraper or chair attachments.



REX DROP FORGED CHAINS



are preferred for log haul and refuse conveyor service where high strength and relatively low cost are desired. Drop Forged Chains are flexible in two directions, and assembly and disassembly can be made without the use of tools. Chain parts are forged from high carbon steel and are carefully designed for large bearing areas and wearing surfaces. Links can be turned over to provide a new sliding surface after long service.

For the complete story on the complete Rex line of pulp mill chains, call your Rex District Office or write direct for Catalog 48-27. Chain Belt Company, 1714 W. Bruce St., Milwaukee 4, Wis.

CHAIN BELT REX COMPANY

DRIVE AND CONVEYOR CHAINS

FIRST FOR LASTING SERVICE

now available from stock

The Paper Industry Names in the News

Smith & Lewthwaite Get New Appointments at C-Z Port Townsend Div.

A division of responsibilities at the Port Townsend, Wash., Division of Crown Zellerbach Corp., has resulted in the appointment of Beverley C. Smith as assistant resident manager.

Mr. Smith has been with the company since 1937 following his graduation as chemical engineer from the University of Washington. He worked consecutively in the technical control department, then as technical assistant to the pulp mill superintendent, and has served as acting assistant manager in recent months, pending the permanent appointment just announced by Resident Manager Leo Ziel.

Norman A. Lewthwaite, who formerly acted as assistant resident manager, has been appointed to the newly-created position of assistant to the resident manager.

Both men will work under Resident Manager Ziel. Mr. Smith will be responsible for more routine work, while Mr. Lewthwaite will be concerned with special projects for Mr. Ziel.

Managers Yeast and Nixon Transferred by I. P. Co.

Several important managerial changes recently were announced by International Paper Co.

I. Y. Yeast, who has been mill manager at the Springhill, La., plant, has been transferred to the company's new dissolving pulp mill at Natchez, Miss. Succeeding him at Springhill is J. F. Nixon, who has been mill manager at the Moss Point, Miss., plant.

Lewis & Heaslip Made F-M Vice Presidents

At a recent meeting of the board of directors of Fairbanks, Morse & Co., Chicago, two new vice presidents were elected. O. O. Lewis, who was made vice president in charge of sales, also was elected a director.

F. J. Heaslip, who has been a member of the board for several years, was elected vice president in charge of purchases and traffic.

Wyandotte Promotions

Elections at the annual meeting of Wyandotte Chemicals Corp., Wyandotte, Mich., included promotions of Ford Ballantyne, Jr. and William Day.

Mr. Ballantyne, formerly assistant to the president and secretary of the corporation, has now become a vice president.

Ford Ballantyne

Wm. R. Day

Formerly head of the patent section of the research and development division, William Day has been made assistant to the president and director of the company's legal activities.

All other officers of the Wyandotte company were re-elected.

Davidson Elected Link-Belt V. P.

Recent elections of Link-Belt Co., Chicago, resulted in the election of David E. Davidson as vice president for sales, with headquarters in the firm's Chicago offices. All officers who served last year were re-elected.

D. E. Davidson

Eugene P. Berg

Mr. Davidson, a graduate of Armour Institute of Technology (now I.I.T.), has been associated with Link-Belt since 1924, and has served as general manager of the company's Pershing Road, Chicago, plant, since 1947.

The recently named assistant general manager of the Pershing Road plant, Eugene P. Berg (Cf. P. I. and P. W., Dec., 1949) will succeed Mr. Davidson as general manager.

John Macleod Made Sales Director of National Container

The newly-appointed director of sales of mill and corrugated paper products for National Container Corp., New York, is John H. Macleod who was until very recently vice president in charge of sales for The Hinde & Dauch Paper Co., Sandusky, Ohio. Officials of National Container state that Mr. Macleod will be elected vice president and chairman of the firm's sales committee, and will direct national company sales activities.

After service in World War I, in which he held the rank of Major, Mr. Macleod entered the investment business, and in 1926 became associated with Hinde & Dauch as vice-president.

Active in corrugated and fiber box industry and association work for more than 20 years, Mr. Macleod was president of the National Container Association in 1930, and served as vice president and director of the American Management Association. He was active in the organization of that association's Packaging Conference and Exposition.

Donald Maclaurin Joins Institute of Paper Chemistry Staff

The appointment of Donald James Maclaurin as research associate and chief of the pulping section of The Institute of Paper Chemistry, Appleton, Wis., became effective recently. Mr. Maclaurin is a graduate of the Institute, having been granted his M.S. degree there in 1937 after taking undergraduate work at the University of British Columbia.

Mr. Maclaurin, a member of several industry associations, has been active in paper mill work since 1932, when he was employed at the British Columbia Pulp and Paper Co., Ltd., in various operating and technical work. From 1937-1941, and after his return from

service in the Royal Canadian Air Force in 1944, Mr. Maclaurin was associated with Spruce Falls Power and Paper Co., Ltd., advancing from assistant sulphite superintendent through several positions to that of technical superintendent. Leaving the Spruce Falls firm in 1946, Mr. Maclaurin became control superintendent for Powell River Co., Ltd., in 1946 and was advanced to technical director in 1949.

New Research Job at Westfield River Paper Filled by Ira Sawyer

The newly created position of field research director of Westfield River Paper Co., Inc., Russell, Mass., has been filled with the appointment of Ira L. Sawyer.

Ira L. Sawyer

Mr. Sawyer, for the past 21 years associated with Paterson Parchment Paper Co., Bristol, Pa., represented that company during the recent war as a Washington consultant to various branches of the Armed Services, Lend Lease, and Foreign Procurement Commissions.

Loddengaard Elected Pres. of United Board and Carton Corp.

The board of directors of United Board and Carton Corp., Syracuse, N.Y., recently elected P. M. Loddengaard as president. Mr. Loddengaard, formerly executive vice president of the firm, succeeds Fred Enders who was named chairman of the board of directors at the same meeting.

W. S. Stuhr, former chairman of the board, was chosen chairman of the executive committee.

Feldmann Resigns from Electric Mach'y Mfg. Co. to be Worthington V.P.

The resignation of Walther H. Feldmann as president of Electric Machinery Mfg. Co., Minneapolis, was announced by the parent company, Worthington Pump and Machinery Corp., effective May 1. The appointment of Mr. Feldmann as vice president in charge of sales for Worthington was announced at the same time. He will be located at Worthington headquarters in Harrison, N. J.

Mr. Feldmann had been associated with Electric Machinery Mfg. Co. since 1922. He had served as president since 1944.

Other Worthington appointments announced are: John J. Summersby, who becomes vice president in charge of purchases; Frederic W. Thomas, now general manager of purchases; and Carleton Reynell, general representative, sales and purchasing departments.

Rockstrom now Chief Engineer with Cameron

The former director of engineering for F. X. Hooper Co., Inc., Glenarm, Md., Leonard Rockstrom, has joined Cameron Machine Co., Brooklyn, N.Y., as chief engineer. Mr. Rockstrom will be responsible for all new design and development work on slitting and rewinding machinery.

Prior to his association with the Hooper firm, Mr. Rockstrom was a partner in the firm of Briglia and Rockstrom, engaged in research and development work, and has served in several other responsible capacities.

Marvin Jones, manager of the Weyerhaeuser Timber Co. pulp division at Springfield, Ore., recently announced his resignation. Mr. Jones, who has worked in the field of paperboard manufacture, had been with Weyerhaeuser for about a year. Previously, Mr. Jones was with Michigan Carton Co.

Marvin C. Jones

S. W. Franklin

S. W. Franklin has been named director of merchandising for Hudson Pulp & Paper Corp., New York. Mr. Franklin, who will be in charge of all Hudson merchandising activities, was previously occupied in several sales management positions with Lily Tulip Corp., where he introduced that company's selective distribution program to the New York market.

Harry Warburton, formerly assistant to the general superintendent of Price Brothers & Co., Ltd., at Kenogami and Riverbend (P.Q.) mills, has been appointed groundwood superintendent of the Riverbend mill. He succeeds M. A. Macdonald, who recently retired.

J. Victor Kinsman, purchasing agent of Spruce Falls Power and Paper Co., Ltd., Toronto, from the time of its inception, has retired due to ill health. Mr. Kinsman had in the past been in charge of purchasing for Kimberly-Clark Corp. of Canada, Ltd., LongLac Pulp and Paper Co., Ltd., and Upper Canada Timber Co. Ltd. J. D. Hofman has been named acting purchasing agent for the Spruce Falls company.

Columbus Basile was elected vice president for operations of Link-Belt Speeder Corp., Chicago, at a recent meeting of the board of directors. Mr. Basile, who will make his headquarters at Cedar Rapids, Ia., goes to Link-Belt Speeder from the parent Link-Belt Co. Caldwell plant in Chicago, where he had been shop superintendent since 1947. Mr. Basile first joined Link-Belt as a general shop worker in 1928. From 1941 he served successively as foreman of machine shop at Link-Belt Ordnance Co., Chicago, as head of time-study and methods at the Philadelphia plant of Link-Belt; and as superintendent of the Chicago Caldwell plant.

Columbus Basile

C. L. Reynolds, formerly assistant to the director of multiwall bag sales for Union Bag & Paper Corp., New York, has been appointed control manager of the corporation upon the resignation of W. A. West from the position. Mr. Reynolds has been associated with Union Bag and Paper since 1940.

John M. Rottier, of Grand Rapids, Mich., has been appointed district manager for the Lake States region by American Forest Product Industries, Inc. His office will be located in Milwaukee, Wis., at 1124 N. Astor St. Prior to his appointment by AFPI, Mr. Rottier was director of publicity for the Idaho Department of Forestry.

Leonard P. Taylor has resigned his position as superintendent of Keith Paper Co., Turners Falls, Mass., to become superintendent of the Franklin Paper Co. mill at Landenberg, Pa. Before joining the Keith company, Mr. Taylor had been associated with American Writing Paper Corp., Holyoke, Mass., and Byron Weston Co., Dalton, Mass.

THE MIDDLE ATLANTIC AREA - - - another in a series of scenes . . . regions where Appleton Wires serve the paper industry.

BACKTRACK from the Ohio river valley through the Middle Atlantic Area . . . cross rugged, mountainous Pennsylvania to New York and the Atlantic Coast, and you have traversed an area of typical, diversified America.

Here, blended in with an economically healthy panorama of agriculture, romantic river traffic and busy industrial centers is the paper industry. Yes, here are hundreds of mills . . . and, you can bet that practically every one using Fourdrinier wires already knows that *Appleton Wires are Good Wires!*

APPLETON WIRE WORKS, INC., APPLETON, WISCONSIN

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"Beware of little expenses! A small leak will sink a great ship."

—Ben Franklin's Almanac, 1757

One penny dropped maketh not much noise but thousands of pennies dropped over the year maketh a big bang before ye annual stockholders' meeting.

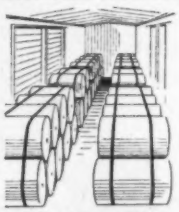
—Acme Steel's Notebook, 1950

Dear Sir: Maybe you have had too much else on your mind to worry about how your company packages, ships, or handles materials within your plant.

But in these days of rising costs, you can't afford to pass up the savings you may be able to make in this part of your business.

Here at Acme Steel Company, we have shown more than 50,000 customers how to cut costs, save time, labor and materials with Acme flat steel strapping, Acme stitching machines and wire, and other Acme Steel products. In 9 out of 10 cases, Acme sales engineers are able to start you on the road to thrifty benefits.

Here you see an Acme load-bracing method and an Acme tool of particular interest to the paper industry. It takes only a minute to read about them—and not much longer to pick up your telephone and call the Acme Steel Company service office nearest you. (There are 46 of these offices in the principal cities of the U.S. and Canada.) Or mail the coupon today for more information and detailed case studies in your particular field.



PREVENT DAMAGE IN TRANSIT!

Acme Unit-Load Methods applied to shipments of paper mean safety and economy in handling shipments wherever slight damage is costly.

SPEED HANDLING WITH EFFICIENT ACME TOOLS!

This Acme E9AO Strap Cutter cuts all sizes of steel strapping easily, with minimum effort. Durably made from drop forgings, with flat, easily inserted alloy steel blade. Weight: 6¾ lbs.; overall length: 25⅝ inches.

ACME STEEL

Of the 3759 Acme Steel employees, 318, or 8.5%, have worked with Acme for more than 25 years each and are members of our Quarter Century Club. Their total service represents 8618 years—tribute to "A Good Place to Work."

ACME STEEL CO. CHICAGO

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We manufacture _____. Please send me booklets on Acme Methods checked.

- ☐ Please have sales engineer call.
- ☐ **Shipping (Carload and L.C.L.)**—"Acme Unit-Load"—The story of reduced damage claims and better handling for shippers.
- ☐ **Packaging, Shipping, Materials Handling**—"Savings in Shipping" tells how to save money and safeguard customer good will with Acme Steelstrap.
- ☐ **Bag and Box Assembly**—"Profit by Stitching" demonstrates cost-cutting Acme Silverstitchers and Acme-Champion Stitchers.
- ☐ **Product Assembly**—"Acme-Morrison Metal Stitchers"—for savings in fastening metal-to-metal or metal-to-other materials.
- ☐ **Book Assembly**—"Acme-Morrison Book Stitchers" for savings in the graphic arts field.

NAME _____ POSITION _____

COMPANY _____

STREET _____

CITY _____ ZONE _____ STATE _____

ACME STEEL CO. CHICAGO

Joseph H. Bach has accepted the position of superintendent of the Hinsdale, N.H., Hinsdale Paper Co. Mr. Bach, who recently resigned as superintendent of the Pearl City, Mass., mill of American Tissue Mills, will be in charge of all paper mill operations in both the Hinsdale and Fisk divisions of the Hinsdale firm.

Lawrence J. Finnan, Jr., formerly assistant director of purchases for Hercules Powder Co., Wilmington, Del., has been named director of purchases. Mr. Finnan's predecessor, Andrew Van Beek, is rejoining the firm's explosives department to take over matters concerning government contracts and problems relating to national defense.

Lowell O. Gill, who has been assistant technical director of A. E. Staley Mfg. Co., Decatur, Ill., has been named technical director, succeeding Howard File, head of the company's research and technical program since 1919. Mr. File has resigned for health reasons, but he will continue to serve the company in a consulting capacity.

J. Norman McDowell, former president and director of Carew Manufacturing Co., South Hadley Falls, Mass., has been appointed manager of the General Paper Co. mill, Beaver Dam, Pa., subsidiary of West Disinfecting Co., Long Island City, N.Y.

John W. Mantz, for the past two years industrial relations manager of the Painesville, Ohio, plant of Diamond Alkali Co., has been promoted to the newly-created post of assistant general manager of the plant.

Erwin B. Martin has been named as sales representative in the Chicago area for the Paper Division of Minnesota and Ontario Paper Co., Minneapolis.

Robert W. Lea, president of Johns-Manville Corp, New York, was recently elected a member of the board of directors of Olin Industries, Inc., East Alton, Ill.

Don Grant has been appointed chemical representative for Harris-Seybold Co., to serve in the Chicago and midwest territory. Mr. Grant, who has been associated with Harris-Seybold since 1945, will work out of Chicago as sales representative for Harris Litho Chemicals.

For a **Quality** *impression...*

PIGMENT YOUR COATINGS WITH TITANOX

It's easy for your coated stocks to make a *quality impression* when they are pigmented with TITANOX. Show-through is minimized, legibility improved and light weight coatings made equal to old style heavy coatings.

TITANOX pigments enable you to increase the brightness and opacity of your coatings or where desirable to maintain constant brightness with greatly increased opacity. In some light coatings or where it is desirable to achieve exceptionally high opacity the pure titanium dioxide, TITANOX-A-WD is recommended. On the other hand for heavier coatings or where it is not essential to use the full power of pure titanium dioxide, the rutile-calcium pigment, TITANOX-RCHT has proved to be effective and most economical. Often, combinations of these two pigments prove the best choice.

Both TITANOX-A-WD and TITANOX-RCHT because of their fine particle size disperse easily and uniformly in coating mixes. Our Technical Service Department is ready at all times to help you in choosing the TITANOX pigment best suited to your particular needs.

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Subsidiary of NATIONAL LEAD COMPANY

Stop VALVE SHOPPING!

for BRONZE — IRON — STEEL — CORROSION-RESISTING Valves

POWELL *makes them all*

Fig. 1893—Flanged end Gate Valve designed and developed especially for Paper Mill service. Body, bonnet and yoke are cast of 3% Nickel Iron; screwed-in seat rings are of 18-8 SMo; solid wedge is made of Ni-resist.

Fig. 375 — 200-pound Bronze Gate Valve with screwed ends, inside screw rising stem, union bonnet and renewable, wear-resisting "Powellium" nickel-bronze disc.

When you want to buy a new suit, you don't shop for the coat in one place, the vest in another, and the trousers in still another.

But that's just what you do if you get your bronze or iron valves from one source, cast steel valves from another and possibly special design or alloy valves from several others.

No one makes better bronze, iron or steel valves than we do. And, in the field of special design and alloy valves for corrosion-resistance, Powell has always led the way. Today Powell makes the *only* COMPLETE line of these valves available.

In short, Powell makes all kinds of valves* needed in your industry—and makes them better. So stop shopping for valves. Standardize on Powell . . . and centralize responsibility for the efficient operation of the entire flow control system in your plant.

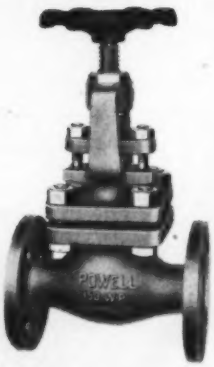


Fig. 1969—150-pound Stainless Steel O. S. & Y. Gate Valve. These valves, in sizes 1¼" and smaller, have been modified and are now available with face to face dimension conforming to MSS SP-42 Standard. Sizes 2" and larger conform to A. S. A. B 16.10 Standard.

Fig. 559 — 125-pound Iron Body Bronze Mounted Swing Check Valve. Flanged ends bolted flanged cap and re-grindable, renewable bronze seat and disc.

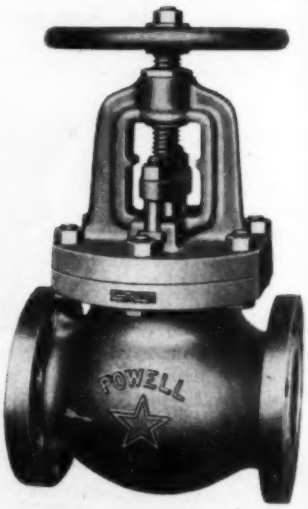


Fig. 1531—Class 150-pound Cast Steel Globe Valve with flanged ends, bolted flanged yoke and outside screw rising stem.

***The Complete Powell Line includes Globe, Angle, "Y", Gate, Check, Non-return, Relief and Flush Bottom Tank Valves in Bronze, Iron, Steel and a wide range of Corrosion-resistant metals and alloys.**

Ask your nearest Distributor—or write direct

The Wm. Powell Co., Cincinnati 22, Ohio

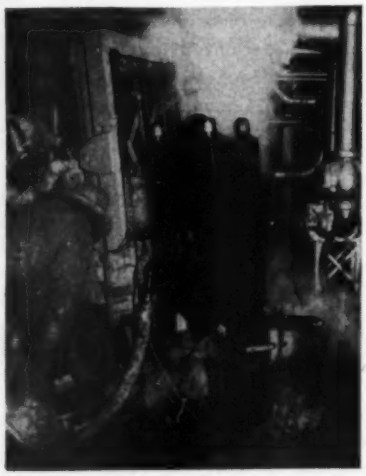
DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

POWELL VALVES

The Paper Industry Practical Shorts

Lift Truck Substitute for Pile Driver

Maintenance engineers were confronted with the job of reinforcing the paper mill floor for a new headbox for No. 3 paper machine. Because the low clearance between the main floor and basement floor would not permit use of an ordinary pile



driving rig, they hit upon the lift truck as a possible substitute. After contractors (Raymond Pile Co.) were called in, it was agreed that piles could be driven by attaching a steam hammer to the forks of an electric lift truck. A tie-in with one of the steam headers in the plant furnished power for the 5,000 lb. hammer.—From *The Digester*, published by Union Bag & Paper Co., Savannah, Ga.

Care of Rubber Rolls

Rubber-covered rolls are no different from any other piece of machinery. They require care and attention to prolong life and to give satisfactory results same as other things.

Keep your reserve rolls where the temperature is between 50 and 60 deg. F. If rubber-covered rolls are shipped to you during the winter season, take them from the cars promptly and store them where the temperature is as near 50 to 60 deg. F. as possible.

If the rolls have been in storage for any length of time, examine the surface carefully for signs of crystallization or oxidation. If such chemical action is in evidence, recondition the rolls by regrinding them before putting them onto the machine.

Light, air and excessive heat all affect the surface of rubber-covered rolls, while dead storage for a period longer than a month may result in an oxidized "skin" forming on the roll surface. If this "skin" is not removed before putting the roll into service the speed of the roll and the pressure on it while in operation will tend to check the surface and create cracks. Cracks, once started, will naturally become deeper and more serious as the roll continues in use, eventually marring the surface of the sheet.

The rubber cover on a roll may be seriously damaged by continuous contact with oil or grease. Such contact is entirely unnecessary —it MUST be avoided, if satisfactory service is to be obtained from the roll.—From *The Messenger*, published by Shartle Brothers Machine Co.

Could It Happen to You?

WHILE AN employee was looking up at the ceiling to determine the direction in which he should run a pipe line, foreign particles lodged in his eye. He had been wearing goggles but took them off to get a better look.

Wear your goggles at all times.

A LADDER was placed on the fourth step leading to a decker walkway. While an employee was ascending the ladder to remove a conduit pipe clip, the ladder slipped off the step down to the floor about 32 inches below, causing the employee to fall on top of the ladder.

Ladders should be placed on safe surfaces and should be held by a fellow worker or securely tied in place.

WHILE A PAIL of mason's tools was being lowered into a digester on the end of a ¾ inch rope, the rope broke and the pail fell 25 feet onto an employee's head. Since he was wearing a protective helmet, his injuries were limited to broken glasses and jarred neck and shoulders.

The rope had been carelessly stored so that it had been eaten by digester fumes to such an extent that it broke while in use.

AN EMPLOYEE's hand became blistered while he was operating the chain hoist used to change the reels on a paper machine. The next day he opened the blister with a needle. Three days later coal oil which he was using entered the blister, infecting the hand.

This employee not only failed to get first aid when first injured but tried to treat himself, causing two days' layoff.

AN ELECTRIC truck driver had dismounted his truck and lifted an elevator gate. Getting back on his truck, he backed it onto the elevator and was jammed against the gate which had partially dropped.

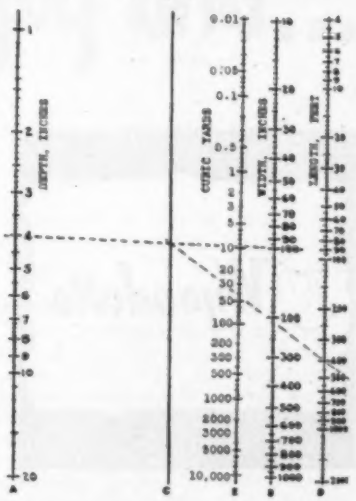
Elevator gates should be checked regularly and counterweights adjusted when necessary.

—From the *News Letter*, published by Pulp and Paper Section of the National Safety Council.

How Many Cubic Yards of Concrete?

This simple chart makes it easy to find the number of cubic yards of concrete required for any depth of walk, road, or what not. It does away with pencil figuring entirely.

For example, if you want to build a walk 4 inches deep, 100 inches wide, and 400 feet long, the dotted lines drawn across the chart show how it is done. Connect the 4 inch depth, column A, with the 100 inch width, column B, and locate the intersection with column C. Then from that point of intersection run through the 400 foot length, column D. The answer is immediately given in column E as about 41 cubic yards.



But that isn't all. The chart is applicable to any dimensions. Thus, for example, if the depth is 40 inches instead of 4 inches, merely add one cipher to the answer in column E and you will have 410 cubic yards. The same dotted lines can be used to find that answer. And again, if the depth is 40 inches and the width 1000 inches, the answer becomes 4100 cubic yards by adding two ciphers. In other words, if it is necessary to add ciphers in column A, B, and D, the total of those added ciphers must be added to the answer in column E. However, the chart is broad enough to cover most concrete jobs without the necessity of ever adding any ciphers.

—W. E. SHAPHORST, M. E.

Famous trademarks in paper

Known throughout the Paper Industry are the familiar trademark of the Kalamazoo Paper Company and the slogan, "Good paper since 1867." Today, the Kalamazoo Company comprises three paper mills and two coating mills, producing more than 255 tons of finished products every day. Specialized Kalamazoo grades include Book, M. F. Label, Offset and Writing, Coated Book and CIS Label papers.

...and paper making chemicals

For many years, Wyandotte Chemicals Corporation has made a business of developing and supplying chemicals designed to meet the Paper Industry's most exacting requirements.

One such chemical is Wyandotte Precipitated Calcium Carbonate *(Purecal-M*)*, a unique paper-coating pigment known for its smooth texture and high whiteness. When used in the coating formula, this refined, uniform product helps furnish a superior sheet with good opacity, ink absorption and printing qualities. Its complete freedom from grit and abrasives insures a bright, smooth coating that will not affect printing rolls. And it has the characteristics desirable for "on-the-machine" or "off-the-machine" coating.

Why not get *all* the facts on Wyandotte Purecal-M? Write today for complete information and technical data.

**Purecal-M is Wyandotte's new trade name for Precipitated Calcium Carbonate.*

Wyandotte Chemicals Corporation
Wyandotte, Michigan • *Offices in Principal Cities*

SODA ASH • CAUSTIC SODA
BICARBONATE OF SODA
CALCIUM CARBONATE • CALCIUM CHLORIDE
CHLORINE • HYDROGEN • DRY ICE
SYNTHETIC DETERGENTS • GLYCOLS
CARBOSE (Sodium CMC) • ETHYLENE DICHLORIDE
PROPYLENE DICHLORIDE
AROMATIC SULFONIC ACID DERIVATIVES
OTHER ORGANIC AND INORGANIC CHEMICALS

The Paper Industry International Review

Complete Export Service Offered by New Firm

A new service is being offered to domestic or foreign manufacturers and distributors not actively engaged in export, or dissatisfied with exporting results.

The Foreign Trade Guild, established in 1949 by M. G. Garcia, analyzes a client's product, potential markets for it, and determines the client's policy and organizational aims, before taking over all details of transaction. In addition to a continuing service, the firm furnishes New York office facilities, current trade information, and field correspondents' reports to the client.

Offices of the new organization, headed by Mr. Garcia, are at 11 West 42nd St., New York 18, from where further information may be obtained.

Recovery of Pulp and Paper Industry in Europe Is Indicated

A significant trend toward recovery of the western European pulp and paper industry is indicated by the decreasing authorization made by the Economic Co-operation Administration for purchases of the commodities outside the Marshall Plan nations.

Authorization for the purchase of pulp and paper dropped to less than $30,000,000 the second year of ECA operations, from a first year budget of $68,000,000; total approvals for the third year of operation are estimated at $20,000,000. ECA dollar authorizations are decreasing gradually as European production facilities are improving so that Marshall Plan countries are able to increase their own dollar earnings; ECA pulp and paper purchase authorization will end in June of 1952.

Increased emphasis is being placed on switching allocations in the pulp and paper field from purchase of raw materials to purchase of capital goods. Requests for pulp and paper mill machinery are expected to increase as European plants begin long-delayed modernization programs. ECA will approve projects which fit into an integrated economy of all of western Europe, but does not plan to finance equipment for plants dependent upon protective tariffs and trade restrictions for survival.

The pulp and paper industry is the leading industry in several of the Marshall Plan countries, and an important industry in all. The industry has no great plants, but includes hundreds of small mills which are vital to the economies of their countries. In some nations the pulp and paper industry is the leading exporter, and its products are important to intra-European trade.

The paper industry is capable of producing six million tons of pulp and eight million tons of paper and cardboard, at a total value of $2,000,000,000 annually, in western Europe. More than 400,000 workers are employed in the industry. It is estimated that to assist the entire physical plant in its present state would require an annual investment of $80,000,000, while replacement would cost more than $3,000,000,000.

Pulp & Paper Mill at Cacia, Portugal, Is Approved by ECA

The first industrial project for Portugal under the European Recovery Program—construction of a new sulphate pulp and paper mill at Cacia—has been approved by the Economic Co-operation Administration.

To be operated by Companhia Portuguesa de Celulose, the mill will have an estimated production of 32,000 metric tons of sulphate pulp of which 8500 tons will be bleached. Of the total production, 14,000 tons will be sold as bleached or unbleached sulphate pulp, and 18,000 tons will be processed into kraft paper.

At present there is only one small wood pulp mill in Portugal, and imports are necessary to satisfy the country's domestic requirements. Production of the new mill is expected to supply all domestic requirements for kraft pulp and paper, and allow a surplus for export. The Portugese balance of trade is expected to improve at a maximum equivalent of $4,000,000 per year.

Mill equipment to be purchased in the United States will require ECA financing of $4,070,000, including $347,000 for packing, transport, insurance and erection. Other equipment with a cost equivalent to $2,170,000 will be purchased in the United Kingdom, Sweden, and Finland; the over-all cost of the project is estimated at the equivalent of $9,580,000. The Portugese government will have a half interest in the company and will grant or guaranteee necessary loans.

A PAPER MILL owned and operated by the Philippine Government started production of kraft wrapping paper on January 16, 1950. This mill has a rated capacity of 20 short tons per day, but for the present output is not expected to exceed 10 tons. The company has a stock of pulp imported from the United States which is sufficient to keep the paper mill running for a minimum of six months. (From *Foreign Commerce Weekly.*)

Foreign Abstracts . . . . . .

Protection of Books Against Insects

The types of insects which cause damage to books (largely in the tropics) and possible means for preventing their attacks are discussed. Methods for eliminating infestations are also described. In the safekeeping of books, clean storage conditions and properly constructed buildings are of prime importance. The books should be free from materials which provide food for insects. Whereas some insects can subsist on paper alone, many insects cause damage by feeding on starch paste and on glue. Thus there would be a marked improvement if books could be bound using nylon thread, synthetic adhesives (like polyvinyl acetate) and bookcloths made of synthetic materials or fabrics treated with plastics. However, inasmuch as the old materials are still being used in quantity, marked protection for books may be obtained by following the recommendations of the "Crown Agents for the Colonies Standard Specification" (the text of which is reproduced).

Special reference is made to the problem of termite infestation. Studies of insecticides or (preferably) repellents which can be incorporated into paper is being made in many countries. Dorothy M. Evans. *Patra Bulletin* No. 9, Leatherhead, Printing, Packaging and Allied Trades Research Assn. 1949, 9 pp. 4 plates.

Rheology of Paper

This is a continuation of articles previously published, and abstracted in THE PAPER INDUSTRY 31, No. 11, 1346 (1950). The authors describe their method for obtaining the visco-elastic properties of paper, using the graphical analysis of the load-elongation curve for a paper strip *(Svensk Papperstidn.* 50, No. 18, 419-32, 1947). When such a strip is subjected to a constant rate of strain, the load builds up linearly for small strains. Subsequently the rate of change of load falls off and the load again increases linearly with strain (but at a much slower rate). The recorded curve thus exhibits two linear parts. If, after the strain has attained a fairly high value, this is held constant, the load in the specimen falls off at a declining rate. However, it does not approach zero, even after several days have elapsed.

The load-elongation curve for paper is similar to that which would be obtained with a spring in paralled with a Maxwell element, which constitutes a spring in series with a dash pot. The authors' graphical analysis is based on this three-element

model. The second, linear portion of a load elongation curve is interpreted to correspond to constant force in the Maxwell element (and constant rate of elongation of the dash pot), and the linear rise of the curve in this portion is attributed entirely to the parallel spring.

Graphical methods are given for determining the spring constants of the two springs, the working curve of the Maxwell element, and from the latter, the rate of plastic flow and viscosity of the material. Graphs are given illustrating the influence of relative humidity and tension on the elastic constants during drying; the dependence of the rate of plastic flow and viscosity on the load on the Maxwell element; and the dependence of viscosity on direction in the paper; rate of extension of the dashpot; tension during drying; relative humidity and beating. In one illustration it is shown that there is a marked connection between the apparent viscosity and the quality of "flongs" (stereotyping mats). All-in-all there are 17 diagrams. O. Andersson, B. Ivarsson, A. H. Nissan and B. Steenberg. *Paper-Maker* (London) 118, No. 5, 335-8, 340-1 (1949). (Through *Bull. Inst. Paper Chem.* 20, 424, 1950.)

Bank Check Paper

Requirements for bank check papers are described, and reference is made to ten (unidentified) samples of "security paper." On ashing, four of the papers (A group) were shown to contain manganese; five (B group) of them contained iron, and one (C) gave no heavy metals.

Individual tests on the blank security papers were made with saturated chlorine-water, 2% aqueous potassium permanganate, 2% potassium dichromate, and acid solution of hydrogen peroxide, 1% potassium ferrocyanide, 1% potassium ferricyanide, 1 *N* nitric acid, *N* sulphuric acid, *N* hydrochloric acid, *N* oxalic acid, *N* acetic acid, citric acid, 10% solium sulphite, 10% sodium bisulphite, and a saturated aqueous sulphur dioxide solution. These reagents did not affect (C). With group (A) chlorine water gave brownish or violet stains; they effected a new design in the sample in group (B). The effect of ultraviolet light on the reverse side of (treated) papers is given, and the reverse sides were also examined after treatment with sodium hypochlorite, chlorine water, potassium permanganate, hydrogen peroxide and water alone. Evidently the samples in group (B) contained water-soluble inks.

In a series of tests the check form was written upon with both aniline and gallotannate inks, the inks removed by oxidizing agents and restoration of the paper attempted with reducing agents. Detailed results are given for one sample in group A and one in group B and for C. Usually in group A and in C, the paper was stained on removing the inks but the color was restored by reducing agents. However, in group (B) removal of the ink had a permanent effect on the appearance of the check. Security papers in group B were affected by heat and ultraviolet light, which serve to bring out the new design (as though an ink remover had been used). Evidently exposure to ultraviolet light for 5 hours (using a Wood lamp) had no such effect on group A or sample C.

The interpretation of these results is that the so-called security papers in group A were treated with a manganese compound which was oxidized to manganese dioxide (brown stain) by the ink remover, but readily reduced to the original color. Samples in group (B) however, had been treated with an iron compound, which when once treated with ink remover, made restoration of the original paper impossible. The security feature of (C) was evidently the watermark. Requirements for security paper are also discussed. These include the use of carefully purified cellulose, and of components which are definitely affected by ink removers (even *water*).

The security papers should stand normal wear and tear, and exposure for a minimum of two years, and mordants should not be used in fixing the inks. Armando N. Capdevila. *Quimica ind.* (Uruguay) 1, 197-222 (1947) (Original in Spanish)—through *C.A.* 44, 3253-4 (1950)).

Fiber Length Distribution Changes During Beating

The shortening of fibers on beating normal sulphite and sulphate pulps, highly purified sulphite and sulphate pulps and various rag halfstuffs was studied by means of fiber length distribution curves. A control study was also made of these stocks prior to beating, and the fiber length distributions were made both by number and by computed "weight." The weight per cent was found by dividing the sum of the fiber lengths in an individual length class by the sum of the fiber lengths for all length classes. Thus the rag halfstuff was found to have a much greater long fiber portion. When the pulps were lightly beaten, sulphite was shortened more rapidly than was sulphate pulp. Purified sulphate showed very few "fines" in the early stages of beating. Tenderized cotton rag stock quickly formed short fibers.

After beating, linen halfstuff was shorter and slower than was cotton. Heavy beating showed marked fiber shortening. Hollander beating had less of a shortening effect than did the Jokro mill. (The author has previously given a full description of how fiber determinations may be made. Cf. Killper, *Wochbl. Papierfabr.* 77, 160, 1949). Wilhelm Killper, *Das Papier* 3, 342-50, 386-93 (1949). (In German.)

Wet Strength Requirements of Packaging Materials

A contribution from the Institut der Lebensmitteltechnologie in Munich, Germany. By making measurements of the cross sectional changes (taken in the middle of the package vertical to the longitudinal axis) the percentages in deformation were computed in the case of containers filled with water at –12 degrees and subsequently thawed out at 20 degrees and 65% relative humidity. The over-all maximum permissible deformation (I) (expansion or bulging) in an 800 cc. container was 11%. With thawing foodstuffs, a correlation appeared between the container stiffness (II) (when wet) and (I). However, no such relation-

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ship was obtained in the case of the wet bursting strength. The minimum value for II at I was 140 grams (as determined with the Bekk apparatus).

When aluminum foil was used to separate the outer and inner walls of the container, or when two plies were present in the container, the wet strength was 2-3 times as high as the sum calculated from the stiffness of the individual board laminates. Packages containing appreciable amounts of wood pulp were less subject to deformation than were those low in groundwood or consisting only of cardboard made only from bleached chemical pulp. J. W. Dijk and G. Kaess. *Das Papier* 3, 424-8 (1949) (In German).

Wet Strength Papers by Use of Melamine Resins

This is the second article from the Aschaffenburger Zellstoffwerke in Germany. (See *Das Papier* 3, 192, 1949 for the first article.) The author studied the impregnation capacity of a number of sulphite pulps (some used for papermaking and others as dissolving pulps) as well as that of their respective alpha celluloses.

In every case, the original pulp retained a greater percentage of melamine resin than did the corresponding alpha-cellulose. For example a bleached beechwood pulp retained 2.1% of the resin whereas the corresponding alpha pulp retained only 0.7%. Often the wet strengths of alpha pulps treated with the resin were negligible, while the wet strengths of the original (treated) pulps ranged from 24-36% of the dry strength. Oxycelluloses absorb melamine poorly. On the other hand, polymethylol derivatives of melamine (especially the hexamethylol derivatives) are strongly sorbed. Usually unbleached pulps took up melamine resin more readily than did the corresponding bleached pulps. Although it was shown that solutions of melamine precipitate lignosulphonic acids, this does not of necessity explain the higher retention by unbleached pulps.

The composition of various commercial samples of melamine resins is discussed. These were white powders containing 30-60% formaldehyde. There is also a discussion of industrial techniques of impregnation and of the order in which the rosin-size, the melamine resin and the alum are to be added. Usually it was advisable to add the rosin size first, following this by the melamine resin and finally by alum. This order of addition gave the best wet strengths when 0.5% rosin size and 1.5% melamine resin were used. The strength of treated pulps was contingent on the beating period. The greatest breaking length, relative wet strength and folding endurance were obtained at 70 degrees Schopper Riegler. With protracted beating these values drop. The effects of resin impregnation on the properties of map, true and substitute parchments, and of spinning papers are described and tabulated. Impregnated spinning papers from sulphite pulps appear to be somewhat stronger than those from untreated sulphate pulp spinning papers. However, treated imitation parchment was found to be weaker than (untreated) true parchment. Paul Lagally. Das Papier 3, 428-34 (1949) (In German).

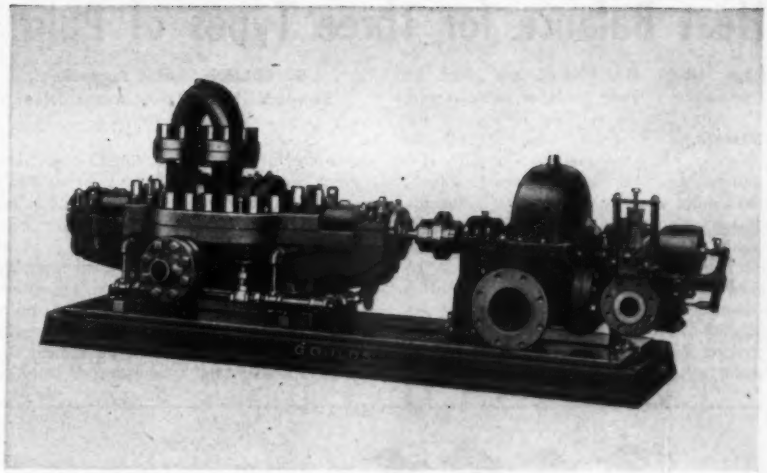

Fig. 3360

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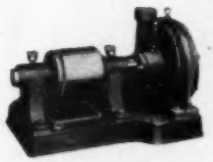

Fig. 3010—Cap. 5 to 100 G.P.M. Heads to 70 ft. Sizes 1″, 1½″, 2″. Open impeller—inexpensive.

Fig. 3650—Cap. to 2000 G.P.M. Heads to 400 ft. Sizes 1″ to 6″. Close-cupled for general service.

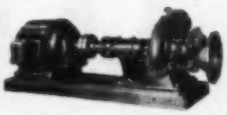

Fig. 3105—Cap. 250 to 4500 G.P.M. Heads to 220 ft. Sizes 4″ to 8″. Heavy duty open impeller type for paper stock, etc.

Fig. 3648—Cap. to 35 G.P.M. Pressures to 190 lbs. Sizes ¼ H.P. to 5 H.P. Centrifugal-jet type.

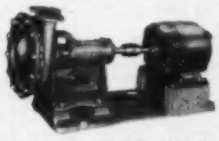

Fig. 3705—Stainless Steel—Cap. to 600 G.P.M. Heads to 200 ft. Sizes 1″ to 3″. Especially designed for corrosive liquids.

Fig. 3450—Cap. to 15,000 G.P.M. Heads to 500 ft. Sizes 2″ to 16″. Double-suction single-stage type.

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Heat Balance for Three Types of Pulp Mills*

G. EDLING, Chief Engineer
Swedish Steam Users' Association
(Stockholm)

SUMMARY ▶▶▶ HEAT BALANCES are given for three types of pulp mills, a sulphate mill, a sulphite mill producing strong sulphite, and one producing rayon pulp. It is assumed that the various departments of these mills where heat is consumed and produced are equipped in such a way that the results of operation correspond to the highest efficiency known in the country in regard to heat economy. The sulphate mill is assumed to operate with a modern spray system for the combustion of black liquor. The cooking method is indirect and the gas and steam relief from the digester is used to generate low pressure steam. Drying takes place in a flakt dryer and the black liquor is evaporated in a multiple evaporating plant using five effects and vacuum. Under these conditions, the sulphate mill will produce considerable surplus heat, which possibly could be still further increased by certain improvements in the heat producing units.

The sulphite mill producing strong pulp is assumed to have suitable equipment for the evaporation and combustion of sulphite waste liquor. The heat required is chiefly provided by burning the waste liquor. Special problems in connection with the burning of sulphite waste liquor are mentioned, for instance, a suggestion indicating the possibility of absorbing SO_2 from the flue gases by using a scrubber-tower in which the gases are treated with a mixture of water and ash from sulphite waste liquor.

The rayon pulp mill is assumed to be equipped with a bleaching plant and evaporators in combination with equipment to burn waste liquor. This mill also may become self-sustaining in respect to fuel like the other types of mill referred to above. This, however, would require full application of our present experience concerning the possibilities available of attaining optimum economy in the various departments of the mill.

Coming here as a representative of the Steam Users' Association to talk about heat in this series of technical-economic subjects, I find it hardly possible to advance anything new that may be considered to have more *general* interest for this body.

It might perhaps have been appropriate for me to talk of the "hunt for calories" and the results achieved, and to give an account of various possibilities of saving fuel in the pulp and paper industries. Nevertheless, I refrain from doing this and shall instead deal with my subject, in the main at least, in quite another manner.

The specific fuel consumption for the manufacture of one ton of pulp has for a long time been decreasing progressively, and everywhere people are at work with the object of bringing down this item of expenditure still further. We Swedish engineers are devoting the greatest attention to these questions. As is well known, there is not lacking a pressing necessity in the matter.

As a rule it is not so difficult to improve what is not good, and this applies equally to fuel consumption, but as the specific fuel consumption goes down it grows more difficult—and more expensive—to carry out still further improvements, and the practical limits as to what can be achieved are gradually approached. It is my purpose in this address to show what results in respect to fuel consumption *at the present day*—regarded from the standpoint of heat practice—lie within the bounds of possibility for some types of mills, and then in conclusion I shall discuss a few questions that are particularly urgent.

In the Steam Users' Association we have compiled some simple tables covering heat balances in three types of mills. What I have to say will be linked to those tables.

First, I would point out that the detailed figures here presented are based on actual operation and measurements, but they have been compiled in such a way that for each production department the best figures available have been taken as a basis. The same could be expressed by saying that the final results shown in the table represent

(*) Translation of an address given in March, 1948, before the Swedish Association of Pulp and Paper Engineers.

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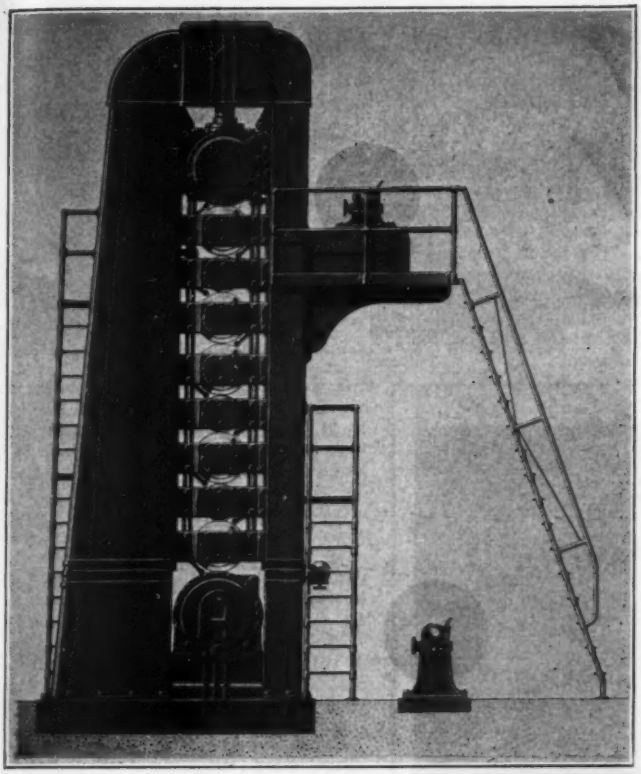

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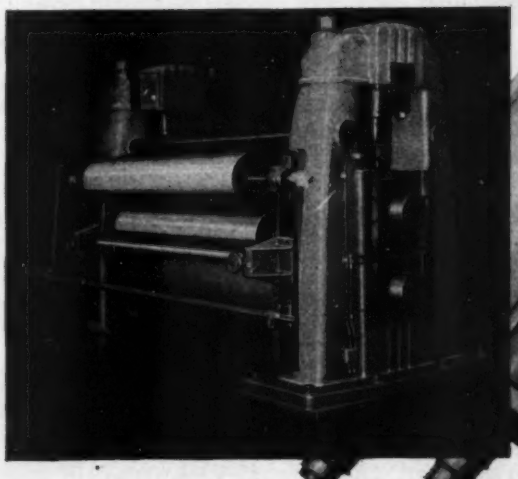

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what might be anticipated in a mill planned today, if the best operating results achieved up to now were *fully* applied. As far as possible, I shall give the conditions for the computations, but times does not permit going too much into details.

Sulphate Mill

I shall begin by dealing with the questions of heat in a *sulphate mill* and show in Table 1 the specific heat figures for each department. It may be well to give the following particulars in explanation of the different items.

Cooking is done directly in 100 cu. m. digesters. Spruce chips with 30% moisture content are employed for the manufacture. The condensate is returned directly to the boiler house. In many plants it has been found difficult to keep this condensate free from black liquor. Suitable automatic devices can check this and discharge the condensate through heat exchangers on such occasions when it is unsuitable as feed water. In any case, the heat content of the condensate should, at least for the most part, be recovered as prime heat. Green liquor, when put into the digester, has a temperature of 80 C., equivalent to the temperature that can be obtained without extra pre-heating of the liquor, provided good heat economy is observed in preparing the green liquor and that heat losses in pipe-lines and cisterns are kept down.

Table 1
Heat Balance in Modern Pulp Mill

Manufacture:	Mcal per ton of pulp	
Strong sulphate (chlorine number 5-6)		
Heat Production:		
In soda house		3,250
Heat Consumption:	Mcal per ton of pulp	
Digesters	750	
Dryers	650	
Evaporation	600	
Miscellaneous	200	
Total		2,200
Heat Surplus		1,050
		3,250

Turpentine gassing should be sufficient but not more. All unnecessary gassing causes direct increase of heat consumption. Here 50 Mcal per ton of pulp has been figured as consumption due to turpentine gassing. At the end of the cooking, de-gassing is done so that the de-gassing steam is converted to pure steam in heat exchangers, this steam being delivered to the low-pressure system, and the equivalent heat amount, 100 Mcal per ton of pulp, has been credited to the digester house.

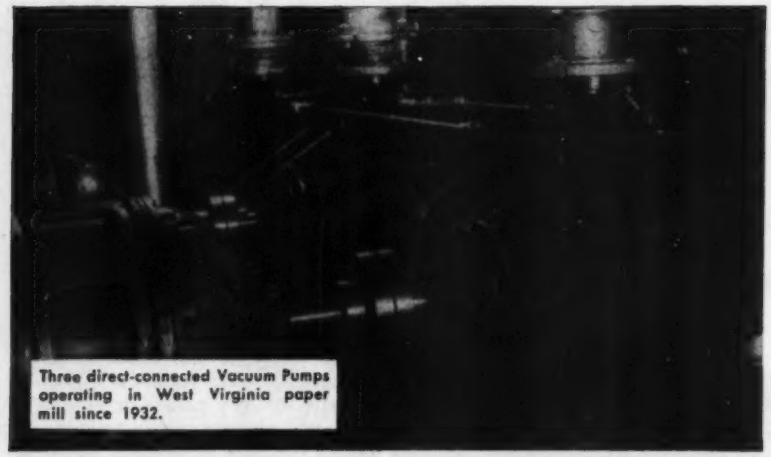
The amount of heat liberated in blowing is utilized for heating water in suitable combination with the condensor in the evaporation plant.

Drying is assumed as being done in Flakt dryers provided with press arrangements, making the dry content after the last press 46%. Moreover, there is naturally assumed far-reaching heat recovery from the wet air, both for heating the air to the drying machine and the drying chamber, and for heating water.

Properly arranged water heating in the wet air means that about 70% of the dryer's heat consumption as steam may be recovered in the form of water at about the same temperature as the wet temperature of the wet air leaving the dryer (that is, 60 C.).

The evaporation plant is supposed to be arranged in the traditional manner. The number of stages into which the evaporation is divided must be considered for each individual case on the basis of cost, heat and power conditions, etc. In this case a 5-stage vacuum plant has been assumed with coupling III-IV-V-I-II and pre-heating between those stages where the liquor is moving towards higher temperature. The thin liquor is assumed to have 20% dry content, and evaporation is done to 60% dry content, which has been found by experience to be possible, even in "ordinary" Kestner appliances.

The question has been raised whether one should not try to return from the vacuum evaporation now common to the back-pressure evaporation formerly practiced to some extent. The fact is that if the gross consumption as steam in the evaporation plant alone is taken into account, a change from vacuum evaporation in four-stage operation to back-pressure evaporation would mean the same amount of saving of heat as would, e.g., a change in the soda house from an up-to-date SS-unit (Sandberg-Sundblad) to a spray unit, and this would seem to favor a return to back-pressure evaporation. Whether the one system or the other should be adopted depends entirely on the mill's requirements for hot water.



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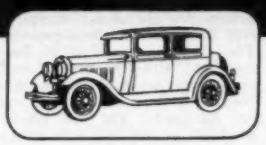

1926

IN 1926 Norton introduced to the paper industry the *first* manufactured pulpstone. It was made only in CRYSTOLON abrasive, in one structure and in a very limited number of grain sizes. Its use was confined largely to producing newsprint pulp in grinders with a power input of about 400 H. P.

But the paper industry was quick to take advantage of the new tool that Norton had developed for it.

1950

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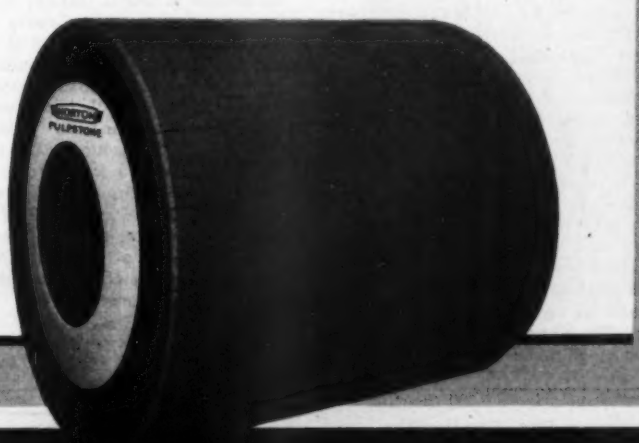
Yes, the paper industry was quick to take advantage of the new tool which Norton originated and introduced to it 24 years ago.

It's easy to tell at a glance the vast improvement that has been made in the automobile between 1926 and 1950. Visually the difference between the original Norton Pulpstone of twenty-four years ago and the Norton stone today is not so apparent but its technological improvement has been tremendous.



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A "vacuum evaporation plant" where, say 90% of the steam from the final effect is used for heating water might justifiably be called a "back-pressure evaporation plant" and, if the hot water is needed and cannot be obtained from other sources at less expense, there can be no reason for changing over to back-pressure evaporation at higher pressure. It would appear as if for various reasons the conditions for satisfactory operating conditions with back-pressure operation at high pressure were now much more favorable than formerly, and this means that a reconsideration of the possibilities of this system would in many cases be well worth while.

The specific heat consumption per kg evaporated water in the evaporation plant is governed by the number of effects and is therefore practically equal for the different designs of apparatus. The heat transmission conditions and the specific load, i.e., the amount of water evaporated per sq. m. of heating area and hour, however, display great variation. The contradiction between, e.g., American and Swedish figures, is often confusing, and even in the one country different firms indicate quite different results. Fresh experiences in this field will be available in the near future. My time does not allow me now to go into these questions, nor into discussion of a number of difficulties that have arisen in this country in connection with the evaporation of the liquor to a high dry substance content.

I have referred earlier to heating of water in the mill and I may add that it does not cause any trouble to meet the requirements for hot water for washing of the pulp, for preparation of green liquor, and for the drying machines by recovery of heat from the blowing of the digesters, the evaporation plant and the saturated air from the drying machines. On the contrary, it may easily happen that the hot water supply becomes too abundant, which necessitates such changes in plant and operation that certain amounts of heat are made available in the form of steam instead of hot water, if the heat requirements prevailing make such a change justified.

The table shows a total *heat consumption* (including the conditional item "miscellaneous") of 2.200 Mcal per ton of pulp (dry content 90%). All condensate returns to the steam boilers and its heat content is to be credited to the departments concerned. If one assumes an average heat value of heat steam of 660 kcal and of condensate of 130 kcal, the computed heat consumption is equivalent to a steam consumption of slightly more than 4 tons of steam per ton of pulp.

The heat is produced in the *soda house*. This is assumed to be equipped with spray unit receiving liquor of 60% dry substance content. The heat production is 3.250 Mcal per ton of pulp and thus considerably exceeds the heat requirement, which of course causes no surprise. This heat surplus may, for instance, be utilized for power generation. Already with a boiler pressure of 40-50 ata the sulphate mill's normal energy requirements can, at least for the main part, be provided for by black-pressure power, which, however, does by no means consume the entire heat surplus here shown. Whether the balance is to be utilized for condensing power or other purposes depends on local conditions and the results of the detailed investigation which naturally must always be made before the technical and economic development of the processes is carried as far as shown here.

The final result for the sulphate mill considered looks favorable but does not by any means represent the limit of what can be achieved.

It is not clear at present whether and to what extent the spray methods so far practiced can utilize to advantage appreciably heavier liquor than that with 60% dry substance content here assumed. If, however, one figures that further evaporation of the liquor from 60% may be done in a back-pressure evaporation plant of some kind, the heat surplus per ton of pulp would rise still more, as the heat production in the soda house would be increased from the 3.250 Mcal per ton of pulp given above to 3.425 or 3.550 Mcal per ton of pulp at a dry substance content in the liquor of 70% or 80%, respectively, and other conditions unchanged.

The result with the higher dry substance contents is naturally independent of whether the liquor is sprayed into the furnace or is introduced by some other method if only a good combustion with small losses can be assured.

It is generally recognized that the flue gases in the soda house can be utilized for heating of water. This has been done in Swedish mills for more than fifteen years, and even Americans are *now* beginning to be interested in this source of heat. The higher the dry substance content of the liquor entering the furnace is the smaller the amount of heat is that can be obtained from the flue gases for heating of water and the lower the temperature of the water will be. What is a paying proposition must be judged for each individual case, in conjunction with the whole heat system of the plant. Merely to indicate what can be achieved, I may mention that with a flue gas scrubber after a soda furnace fed with liquor of 60% dry substance content one can without difficulties obtain approximately 600 Mcal per ton of pulp in the form of clean water with a temperature of at least 50 C. This source of heat may be valuable especially in connection with bleaching plants.

(The second and final installment of this article will be published next month.)

TAPPI Abstracts*

Electrolytic Coagulation, by Paul G. Stephan, Alhydro, Inc., Baltimore, Md. (Water Session)

This paper deals with the principles and developments in the electrolytic production of aluminum hydroxide floc for coagulation purposes. Slides are furnished to illustrate the various points.

The basic fundamentals, which have been recognized for many years, are described and illustrated in the simplest form consisting of two electrodes in a beaker of water with a battery for the direct current source. From this principle the developments are described. The electrolytic method of floc production is compared with the chemical method. Chemical byproducts formed in the chemical process, such as carbon dioxide and calcium sulphate are discussed. The part played by these byproducts in the lime-soda softening process is important because of the increased corrective chemicals required by them.

The use of aluminum hydroxide in the removal of silica from boiler feed waters is described. The removal of silica by absorption with aluminum hydroxide has been tried before, but the sulphates produced in the chemical method have rendered the system impractical. The electrolytic method produces the required hydroxide without soluble byproducts. This fearure makes this method of cold process slide removal quite practical.

Further comparison with the chemical system includes a storage space and weight handling comparison. Only a small percentage of weight and volume is required for the electrolytic method. This comparison is represented graphically on a slide.

Cost data on two municipal installations are presented. One comparison is for a lime-soda softening plant, the other for a purification plant.

A description of the construction and operation of the modern commercial equipment is provided as the closing of this presentation. Here again, slides are used as a visual aid in the presentation for the outline of both construction and operation.

A Method for Preparing Water-Resistant Starch Coatings By the Use of Antimony Salts, by Lawrence Gussman, N. M. Frisch, and F. J. Sweeney, Stein, Hall & Co., New York, N.Y. (Coating Session)

A new method for insolubilizing starch base paper coating colors is discussed.

An antimony salt, potassium pyro antimonate ($K_xH_2Sb_2O_7$) is blended with the regular components of a starch-clay coating color, applied on regular coating equipment, and dried at paper machine drying temperatures to produce a coated paper with good wet rub properties.

The theory of the chemistry of the reaction between starch and the antimony salts is discussed, and the best type of paper coating starch for use with this process is indicated.

Formulations for coating colors for high and low solids coating are given. The effect of pigments, plasticizers, drying-time, drying temperature, and pH on the antimony starch reaction are discussed in some detail.

(*) Abstracted from papers presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, held in New York City, Feb. 20-23, 1950.

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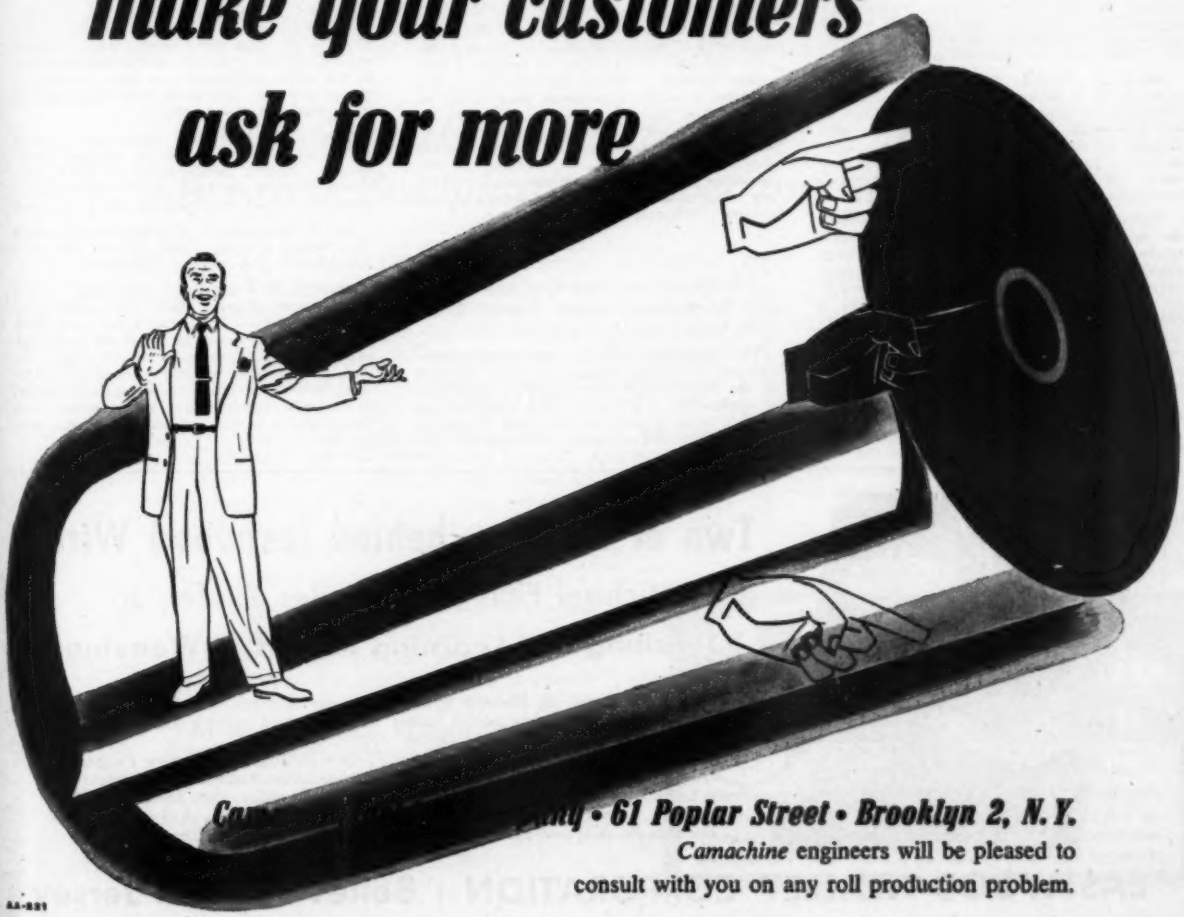

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The major advantage of the process over existing insolubilizing methods, the fact that pH adjustment is unnecessary, is brought out. The antimony starch reaction is most effective in the 7.0 to 7.8 pH range and that pH coincides with maximum clay color fluidities. Since most printing processes are most effective on coated paper with coatings in that pH range, this factor aids printing and ink drying. The insolubilizing effect is evident immediately after the coating and drying process.

Drying time and drying temperature are the critical factors in the efficiency of the process and several charts are presented showing the wet rub of the coating in terms of drying temperatures and time.

Shelf life of the finished coating color is shown to be good and chemicals for varying the viscosity over a wide range are discussed.

The use of potassium pyro antimonate as insolubilizing agent raises the Dennison wax test over the wax of the same color without the antimony salt.

Several forms of the antimony salt are available; dry, white powders, and stable, water-thin, straw-colored 40 per cent solids solutions.

Other uses of the starch-antimony reaction are indicated including application for insulation and wallboard coating, particularly where fire retardent coatings are desired. Other fields where experimental work is in progress are wet-strength papers, asbestos paper and wall paper.

Starch and Its Application in Paper Machine Coatings, by Ralph W. Kerr, Corn Products Refining Co., Argo, Ill. (Coating Session)

A general discussion is given of the physical chemistry of starch and clay colors. The viscosity of aqueous pastes of starch is due to physical association of starch molecules which form hydrated aggregates and to the solution viscosity of very large molecules. Physical association may be either the original association as it exists in the native starch granule or a reassociation of dissolved molecules.

Starch is a mixture of two structurally different types of molecules, linear and branched. The relatively larger branched molecules provide the framework of the granule and are held together by strong physical forces. The linear molecules have a relatively high solution viscosity and show very pronounced reassociative tendencies from solution.

Various procedures which are used to reduce the paste viscosity of native starch to the level where it is usable as the adhesive in high density machine coatings are outlined and compared. Acid acts to cut the starch molecules up into smaller fragments and does so by a random hydroylsis of glucoside linkages in portions of large molecules which connect the crystallite regions of the granule. Enzymes act by a hydrolysis mechanism but break the molecules into more uniform sizes if the starch granule is first dispersed by heating in water. Oxidants and other chemical modifiers create a more permanently soluble molecule but in oxidation at least, the action is usually attended by degradation of the starch molecules. In all of these, weakening of the physical bonds in the starch granules follows as a secondary effect. Minimum starch sol and color viscosities and maximum adhesive strength are obtained when the physical bonds, holding starch molecules together are ruptured and when the dispersed molecules are reduced in size uniformly to a given minimum level.

A new method of modifying starch by treating it as in destrinization procedures in the dry state after the addition of $AlCl_3$ .6 H_2O is described. The action is to weaken granular structure, depolymerize the starch molecules to the level suitable for use as the adhesive in machine coatings and to alter the ratio of linear to branched polymer molecules in starch. Application of this reaction system has lead to the production of starch products of very low viscosity and high adhesive strength.

Combination of the $AlCl_3$ reaction and enzymic conversion is described for the production of high density coatings suitable for machine application.

Studies of Dielectric Properties of Chemical Pulps. III. Dielectric Properties of Cellulose, by Charles R. Calkins, Institute of Paper Chemistry, Appleton, Wis. (Plastics Session)

A test capacitor embodying several desirable features has been designed and constructed for use with a Schering bridge. The loss angle and dielectric constant of native cellulose has been measured at frequencies from 500 to 4000 cycles per second at temperatures from 25 to 105 C., under conditions that assure no inaccuracy as a consequence of the presence of moisture. The observed behavior can be adequately explained if cellulose is regarded as a heterogeneous linear polymer with many polar groups.

Similar measurements with regenerated celluloses showed significant increases in both loss angle and dielectric constant as compared with native cellulose. When these celluloses are subjected to moderate pressures, these values are reduced. A possible relationship between the observed dielectric constant and amorphous cellulose content (estimated by moisture regain) was found. However, the evidence is contradictory (a presumably amorphous cellophane was comparable with native cellulose), and no definite conclusions may yet be drawn.

The Rheology of Paper Coatings, by William R. Willets, Titanium Pigment Corp., New York, N.Y. (Coating Session)

The importance of the rheological characteristics of coating colors, especially in view of the modern high speed printing techniques of application, is discussed. The complexity of coating color systems is described. While no presently available viscometer simulates the high shearing effects experienced in practice, tests should be made with a multipoint viscometer so as to give some indication of thixotropic or dilatant characteristics as well as of apparent viscosity. Certain factors affecting the rheological properties of coating colors were investigated using such a technique. It was found that there was not necessarily a relationship between the rheological properties of the slip and the final coating color. A very slight difference in the total solids content of coating colors resulted not only in marked changes in apparent viscosity, but also in thixotropic characteristics, but the changes resulting from dilution varied with different colors. Coating colors behaved differently on storage some becoming less viscous and some developing more body, the effect evidently depending on such factors as composition, dispersants, pH, and total solids. The use of dispersing agents was very critical and it was apparent that an excess would result in increased viscosity as would the use of too little.

The optimum amount to be used varied with different compositions. Dispersants were found to affect the storage stability as well as the rheological characteristics of the colors as made. While no general rule applicable to all types of coating colors could be derived from this work, the principles and techniques involved could be applied to a specific color to be used in a definite application technique.

Pulping of Scrub Oak (Quercus Laevis) By the Kraft Process, by R. L. Harvin, C. W. Rothrock, Jr., and W. J. Nolan, University of Florida, Gainesville, Fla., and G. B. Hills, Jr., St. Joe Paper Co., Port St. Joe, Fla. (Alkaline Pulping Session)

Pulping characteristics of scrub oak under widely varying cooking conditions are presented. Chemical concentrations of 20, 35 and 50 grams per liter were employed at each of 12, 14 and 16 per cent of total chemical (pounds Na_2O per 100 lb. wood). At all of these chemical conditions, cooking pressures of 100 and 115 psi gage have been studied. Cooks were blown at 1 to 3½ hours cooking time. In all cases, sulphidity was held constant at 25 per cent. A total of 90 cooks was required to explore the above conditions.

Cooking and chemical consumption curves are presented for each set of pulping conditions. Graphical relationships of lignin consumed vs. wood consumed and of chemical consumed vs. wood consumed are shown.

Bleach requirements of selected pulps which were within practical limits of per cent yield and per cent screenings are presented.

Physical test data were determined for a large number of pulps which were within practical yield limits. These data (burst, tear, fold, and tensile) are presented in tabular form and, in a few typical instances, are shown graphically, plotted against beating time. Results show that these pulps from scrub oak compare favorably, in strength characteristics with similar short fibered pulps in use commercially at the present time.

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Legal Phases of Water Pollution Control in Ohio*

F. H. WARING, Chief Engineer
Ohio Department of Health

State legislation. The first legal step taken by Ohio looking toward control of water pollution took place in 1893 when the requirement was imposed upon municipalities to submit plans to the State Department of Health for any proposed installation of sewerage and sewage treatment works. (sec. 1240 O.C.—amended and clarified in 1925.)

Next in 1908 there was enacted the so-called Bense Act (sec. 1249-1261, incl., G, C.) which provided, upon proper petition or complaint, for action by the State Department of Health comprising investigation, finding, hearing, and order for correction of water pollution resulting in nuisances damaging to public health or comfort or pollution of a public water supply. The act required proof of such insanitary conditions as might be caused by discharge of "sewage or other wastes" into the receiving waters. Findings and orders of the director of health were made subject to approval of the public health council after full hearing. Penalty for failure to obey an order might result in a $500 fine.

Amendments to this act 1249-1261 G. C. were made in 1921 (water sections); in 1936 (legal procedures); and in 1945 (a finding and an order become prima facie evidence in a lawsuit for damages on account of water pollution). Constitutionality of the act has been upheld many times and many orders for pollution correction have been issued to municipalities and to industries in specific cases.

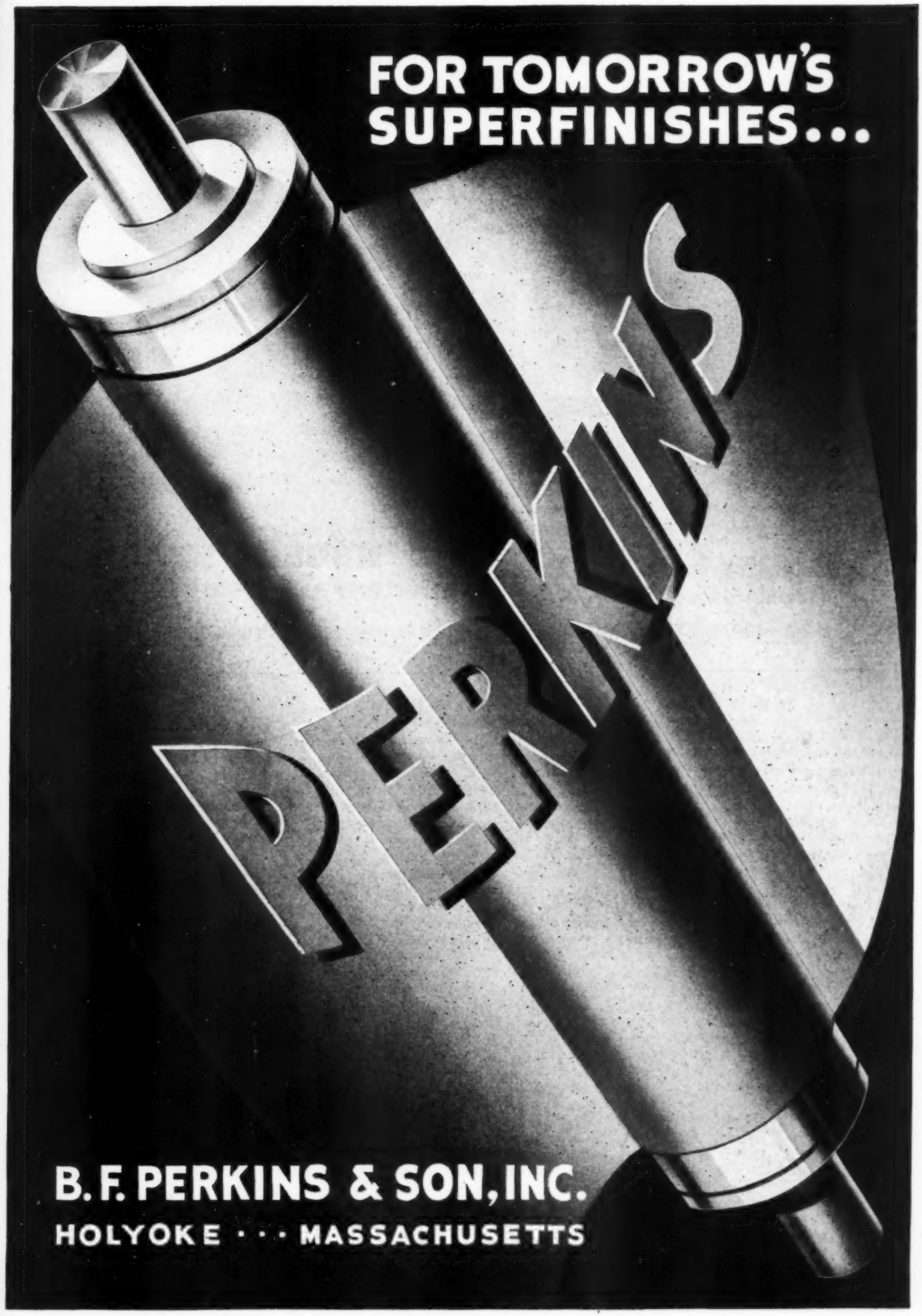
A test case in the Ohio Supreme Court in 1929 (State vs. Williams, Delphos) established the validity of a suit in mandamus commenced in the Supreme Court by the director of health to enforce the order as provided for in sec. 1249-1261, incl., G. C. Subsequently on several occasions, notably in 1934 (State vs. City of Columbus), mandamus proceedings were instituted successfully in Ohio Supreme Court by the director of health to bring about compliance with orders issued pursuant to sec. 1249-1261, incl., G. C., and in lieu of invoking the penalty ($500) provided for in sec. 1260 G. C.

In 1925 the original law of 1893, re-approval of plans, (sec. 1240 G. C.), was supplemented by the enactment of three sections, 1240-1, 1240-2, 1240-3 G C. These sections were specifically directed toward water pollution control and for the first time industrial wastes were mentioned as such. For example, sec. 1240-1 relates exclusively to industrial waste disposal. It makes mandatory the approval of the department of health of disposal plans for all new works and changes to existing works whereby liquid industrial wastes are produced. The next section, 1240-2, gives the department general supervision over the operation of such industrial wastes treatment and disposal works including sewage disposal; submission of performance records and pertinent information may be required. The last section, 1240-3, imposed obligations upon the department to study the lakes and streams, determine uses of the waters, causes contributing to their pollution, practicability of preventing and correction their pollution so as to prevent damage to public health and welfare. Also the department was authorized to adopt and enforce regulations relative to water pollution control.

In 1949 the legislature added another section, 1240-4 G. C., re water pollution control. This section makes it unlawful for public bodies or corporations to continue to discharge from existing sewers untreated sewage or industrial wastes into the public waters of the state. Details of treatment works, including degree of treatment and time for completion of works, must be satisfactory to the director of health. The usual penalty clause of a $500 fine is provided; but there is also included the provision that "proceedings for the enforcement of the provisions of this section shall be instituted in the name of the state by the attorney general whenever requested to do so by the director of health, in the county having jurisditcion or in the conuty of Franklin, as provided by law.

Interstate Legislation. Negotiations among the several states of the Ohio River Valley were undertaken in 1936 to 1938 relative to a uniform legislative control of water pollution. As a result there was proposed the Ohio River Valley Water Sanitation

(*) Abridgment of paper read before the Ohio Section of the Technical Association of the Pulp and Paper Industry, Middletown, Ohio, December 8, 1949.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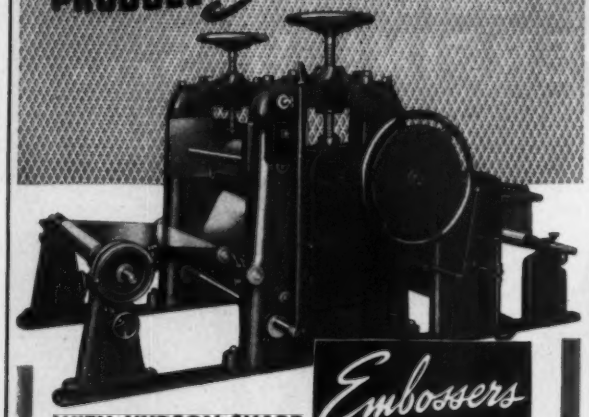

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Compact. Ohio's legislature adopted the compact in 1939. Eventually the last of eight states involved, Virginia, adopted the compact in the spring of 1948. This agreement was effective June 30, 1948.

Article I of the compact states in part—"Each of the signatory states . . . agrees to enact any necessary legislation to enable each such state to place and maintain the waters of said basin in a satisfactory sanitary condition . . ." It was for the purpose of complying with the terms of the interstate agreement that sec. 1240-4 G. C. was enacted by the Ohio legislature in 1949.

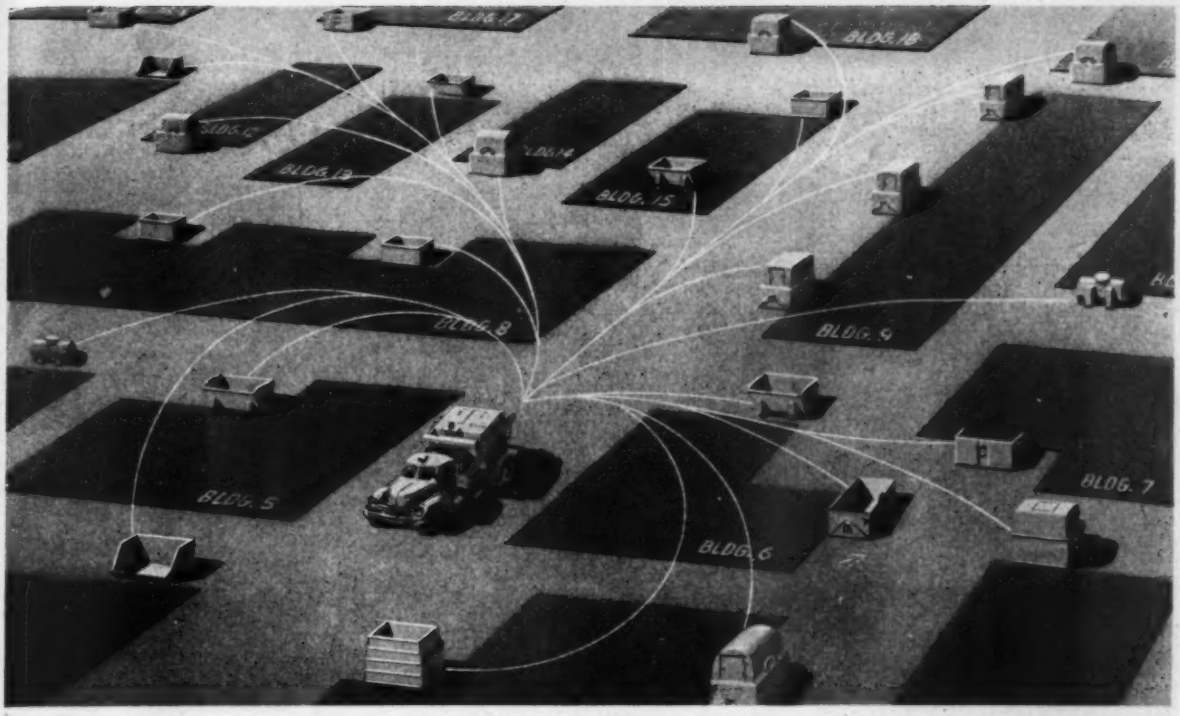
One of the provisions of the compact, article VI, stipulates that all sewage discharged into Ohio River or its tributaries must be treated; the minimum degree of treatment as specified is that ordinarily accomplisehd by efficient sedimentation and is defined as the removal of settleable solids and 45 per cent of the suspended solids. A greater degree of treatment may be required by the commission. Another provision in article VI stipulates that all industrial wastes likewise tributary to the Ohio River system must be treated; the degree of treatment is not specified technically but is described ". . . to such degree as may be determined to be necessary by the commission . . ." In this connection it is interesting to note the wording of the introductory paragraph of article VI which reads as follows: "It is recognized by the signatory states that no single standard for the treatment of sewage or industrial wastes is applicable in all parts of the district due to such variable factors as size, flow, location, character, self-purification, and usage of waters within the district. The guiding principal of this compact shall be that pollution of sewage or industrial wastes originating within a signatory state shall not injuriously affect the various uses of the interstate waters as hereinbefore defined."

The commission is authorized to adopt rules, regulations and standards for administering the provisions of this artcle. In accordance with this authority the commission has enunciated the policy that responsibility for bringing about the objectives of water pollution control of the compact will rest primarily with those state agencies within each state already charged by law with the administering of water pollution control. In Ohio this means the department of health.

Federal Legislation. For many years bills have been introduced in the federal congress proposing federal control of water pollution. Finally, on June 30, 1948, there became effective Public Law No. 845 entitled, "To provide for water pollution control activities in the Public Health Service of the Federal Security Agency and in the Federal Works Agency and for other purposes."

In section I of this act the policy of Congress was declared to be (a) "to recognize the primary responsibilities and rights of the states in controlling water pollution," (b) "to support and aid technical research to devise and perfect methods of treatment," (c) "to provide federal technical services to state and interstate agencies and to municipalities, in the formulation and execution of their stream pollution abatement programs." Responsibilities of the program were placed with the surgeon general of the public health service and with the federal works administrator.

Some of the provisions of this act are as follows: (1) A report is to be prepared by the surgeon general setting forth a comprehensive program of pollution abatement needs. (2) The surgeon general is instructed to encourage water pollution control activities by the states through uniform state laws, interstate compacts, co-operative activities, support and aid in technical research on industrial waste treatment. (3) State water pollution control agencies are eligible for grants-in-aid to assist in carrying out control activities. (4) Public bodies are eligible for grants covering not to exceed one-third of the cost of planning and loans covering not to exceed one-third of the cost of constructing remedial works. (5) An eleven man advisory board recommends policies and programs; board comprised of five ex-officio federal representatives and six outside of federal employ to be appointed by the President, one of whom represents affected industry. (6) Under certain conditions action for abatement of pollution may be taken by the surgeon general (a) if interstate waters are involved, (b) if health or welfare is affected of people in downstream or adjaecnt states, and (c) if the state water pollution control agency requests or consents to the action.



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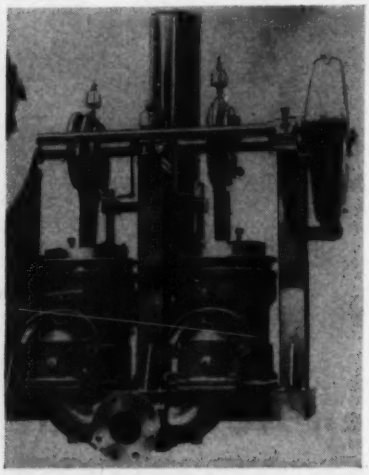

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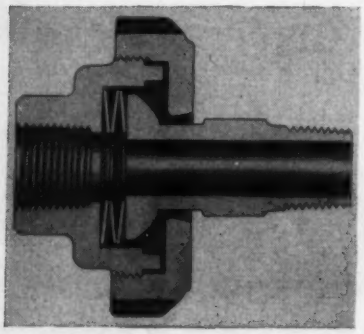

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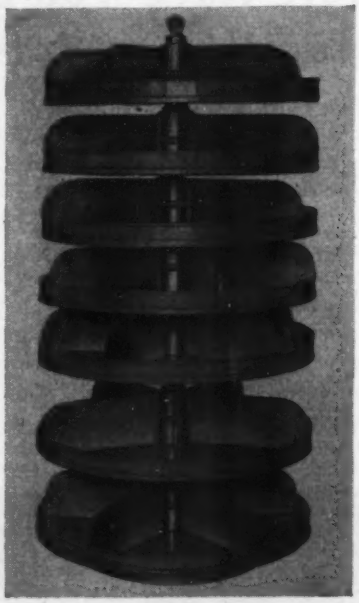
Revolving Bin

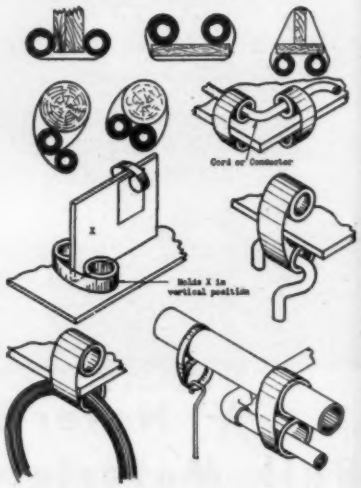
Increases visibility and availability of stored parts.



Each shelf of the revolving storage bin has a continuous label holder, and up to five additional dividers can be added to separate each bin into smaller openings. The manufacturer claims that use of these bins saves time and steps, speeds up service, that shelves revolve easily in either direction on ballbearing rollers, and that shelves are stabilized to prevent sagging when unevenly loaded. Units are available in 7-shelf, 4-shelf and counter-top revolving bins. Typical uses are in all kinds of shops, maintenance departments, repair shops, tool rooms, stockrooms, electrical shops, etc. Lyon Metal Products, Inc., Aurora, Ill.

Industrial Clamp

Can be used over and over for different applications without change.

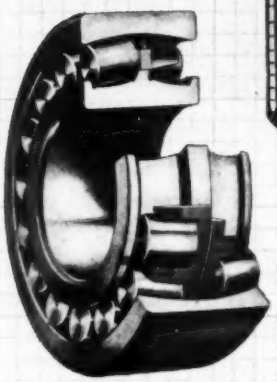


The Neg'ator clamp is a fundamental form of the Hunter Neg'ator, which is claimed to be the first elastic member in history to exhibit negative or constant force-deflection characteristics. These new clamps are made from highest quality, blue tempered, high carbon, spring steel, and are individually oiled for rust protection during storage and shipment. Size of clamps range from 5 oz. to 18 lb. clamping force. Hunter Spring Co., 814 Maple, Lansdale, Pa.

Speed Reducer

Claimed to eliminate the necessity for special engineering.

Designed as a "package" item, the Torque-Arm speed reducer mounts directly on the shaft to be driven, and is primarily for conveyors, bucket elevators, agitators, mixers, feeders, processors and similar machinery. Unit consists of a reducer with a fixed ratio of 15 to 1, driven by a motor through any V-belt or flat belt drive. Re-



TORRINGTON SPHERICAL ROLLER BEARINGS

...improve felt life

Felts undergo less strain and last longer on the Black-Clawson 152" paper board machine installed at the Sutherland Paper Company, Kalamazoo, Michigan, because cylinder molds, couch rolls, upper and lower primary press rolls and wet felt rolls are equipped with Torrington Spherical Roller Bearings.

Despite long center distances and shaft deflections these self-aligning bearings permit smooth operation. Friction drag and binding stresses are avoided.

183 Torrington Spherical Roller Bearings throughout this machine minimize friction loss and wear, reduce horsepower requirements, allow increased machine speeds. Do these benefits give you ideas about how Spherical Roller Bearings can be used to improve your equipment? Our engineers will be glad to help you with your friction problems.

THE TORRINGTON COMPANY

South Bend 21, Ind. • Torrington, Conn.

District Offices and Distributors in Principal Cities of United States and Canada

TORRINGTON *SPHERICAL ROLLER* **BEARINGS**

SPHERICAL ROLLER • TAPERED ROLLER • STRAIGHT ROLLER • NEEDLE • BALL • NEEDLE ROLLERS

"SQUEEGEE ACTION" STOPS VALVE LEAKS

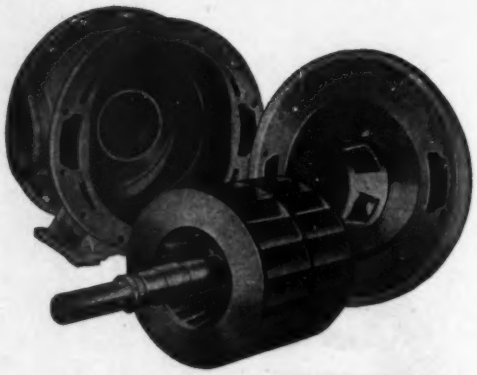
There's a conforming "give" in a rubber squeegee that covers *all* the surface it contacts and wipes *dry*.

In the same way, there's a "give" in the tough rubber face of DeZURIK valve-plugs that gives them "squeegee action" on the valve seat . . . produces a skin-tight, bone-dry closure. The plug-face conforms and seals even if the valve-seat is worn or if it harbors scale or foreign matter.

A trial installation of DeZURIK Easy-Operating Plug Valves will prove that *valve leakage can be stopped!* Write for catalog.

DEZURIK SHOWER CO.
SARTELL, MINNESOTA

SIMPLICITY



NASH VACUUM PUMPS HAVE ONE MOVING PART

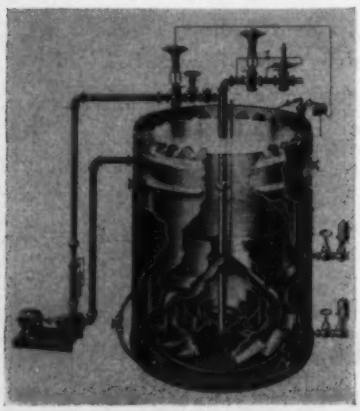
Operating advantages made possible by the Nash principle, and present in no other type of vacuum pump, permit a new level of operating economy. Nash Vacuum Pumps have but one moving part, a rotor cast in one piece, and revolving without metallic contact. There are no valves, no pistons or sliding vanes, no internal parts requiring wear adjustment or lubrication.

NASH ENGINEERING COMPANY
SOUTH NORWALK, CONNECTICUT, U. S. A.

ducer contains a double train of helical steel gears, heat treated and shaved. A torque arm anchors the reducer and provides quick, easy adjustment of the belt tension through the use of a turn buckle. Only information needed by the manufacturer to select the proper reducer is the horsepower required, desired speed, and size of the shaft to be driven. Dodge Mfg. Corp., Mishawaka, Ind.

Water Softener

Employs hydraulic energy for mixing applied chemicals with previously formed precipitate.



A new cold process, slurry-type precipitating water softener and coagulator achieves optimum flocculation without the use of submerged mechanical moving parts within the softener. Complimentary recirculation of treated water maintains a uniform depth of slurry bed independent of load demand. Where filters are used for final clarification, a washer reclamation compartment is incorporated to enable the filters to be economically backwashed with clean, chemically inert water without imposing increased flow rates through the softener. Density of the slurry bed is automatically and proportionately maintained. Worthington Pump and Machinery Corp., Water Treating Section, Dunellen, N. J.

Motors

May be used in locations where Class I Group D explosive materials or atmospheres are encountered.

Designed for constant speed drive applications such as pumps, blowers, or compressors, these heavy steel constructed motors are equipped with pre-lubricated ball bearings that require no greasing program. Special primer, thermoset varnish and nitrocellulose base finish are used. Motors are totally enclosed. Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa.

Voltage Regulator

Provides the narrower band width of 8 step regulators.

Type ML-8 step-type branch line voltage regulator supersedes Type ML-4 step voltage regulator; it provides a total of 10 per cent regulation in eight 1¼ per cent steps, in any of the following combinations: 10 per cent raise, 7½ per cent raise to 2½ per cent lower, 5 per cent raise to 5 per cent lower, 2½ per cent raise to 7½ per cent lower or 10 per cent lower. Available in selected kv-a sizes in 2,500, 5,000 and 7,620-v ratings and corresponding Y-connected voltages. General Electric Co., Schenectady, N. Y.

Dial Micrometer

Made for portability and hand use.

This convenient hand model is especially designed for inspecting, checking, and comparing thicknesses in various locations

This is News!

NEW LOW PRICES OPEN WAY FOR WIDE USE OF ALL-CUPROUS REMOVABLE BUNDLE EXCHANGERS

Redesign and Mass Production Set Costs Lower Than Many Iron and Steel Shell Units

BUFFALO, N. Y.—Extensive redesign of the Ross Type BCP Exchanger, famed for its service on U. S. Navy combat vessels, opens the way for industry-wide use, announces Ross Heater & Mfg. Co.

New, low prices now make an all-copper and copper alloy, removable tube bundle unit available at a considerable saving over cast iron and steel shell units, especially in the smaller sizes, and at competitive costs in many of the larger sizes.

These developments are predicted to have an extremely favorable effect, of far reaching proportions, on both original equipment manufacturers furnishing exchangers as accessories, and industries utilizing exchangers in their own plants.

Boasts larger transfer surface in same size unit

Full standardization and quantity production, bringing about the new, low prices, were not the sole objectives and results of the redesign, Ross points out. Sharing the limelight is the substantial increase in heat transfer surface.

In many instances, a smaller, less expensive Ross Type BCP now serves the same conditions that formerly required a larger, costlier exchanger of conventional design. Passages between tube bundle and shell, that normally remain unused, are filled with an extra ring of tubes in the new Type BCP. By thus eliminating a short circuit of fluid around effective tube surface, and by introducing an improved close tolerance baffle system, Ross has achieved better fluid distribution, hence increased transfer surface. Tubes, even though there are now more of them, have not decreased in size.

Production system speeds shipments

Typically Ross-standardized and Ross-quantity-produced, components and sub-assemblies of Type BCP Exchangers are being carried in stock. Quick assembly to standard or individualized specifications, therefore enables quick shipments.

Offers informative, new literature

Now ready for distribution is a colorful new bulletin (No. 2.2K1) describing and illustrating in detail the design features of the new Ross Type BCP. Copies will be forwarded without charge to anyone requesting on company letterhead.

ROSS

ROSS HEATER & MFG. COMPANY, INC.

Division of American Radiator & Standard Sanitary Corporation

1430 West Ave. Buffalo 13, N. Y.

In Canada, Horton Steel Works, Limited, Fort Erie, Ont.

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GRINDING WHEELS—SEDGEMENTS for
SAW SHARPENING
SAW GUMMING
SHEAR BLADE GRINDING
KNIFE GRINDING

also

METCALF WHEEL DRESSERS
GRINDING COMPOUND (COOLANT)
WELDING ROD FOR SAWS
SAW SHARPENING MACHINES
KNIFE GRINDING MACHINES
(ALL SIZES AND TYPES)

Top quality products every one—to match the high standards of every other Hanchett product!

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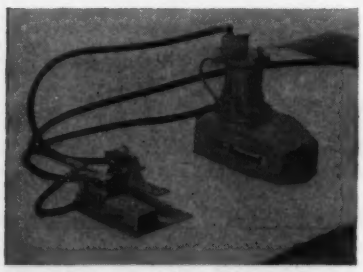
throughout the plant, on the production line, or on the road. The 2¾ inch dial is glass covered, graduated in thousandths of an inch. Anvil is 9/16 inch dia. and permits calipering of thicknesses up to ½ inch on sheet stock or fabricated pieces such as metals, plastics, boards, papers, rubber, felt, or any material requiring accurate thickness measure. An external adjustment is incorporated for maintaining dial indicator at exact zero. E. J. Cady & Co., 134 N. LaSalle St., Chicago 2, Ill.

Hydraulic Pump

Runs continuously by holding open the valve which controls the air supply.



Equipped with a built-in release valve to permit pressurized oil in the hydraulic cylinder to return to the reservoir by gravity, the continuous acting air operated hydraulic pump is similar in design to the single acting pump recently introduced by this company. A single, three-position, four-way valve operates the release and controls the pumping action. Working oil pressure of 1000 psi can be obtained from a 90 psi air pressure. Lyon Raymond Corp., 8059 Madison St., Greene, N. Y.

Control Centers

Contain motor starter units featuring plug-in type disconnects on the line side.

Starter units of these control centers are 20 inches wide by 20 inches deep, with heights in multiples of 14 inches for interchangeability in standard indoor structures either 76 or 90⅜ inches high. Units can be mounted back-to-back in these same structures for utilization of space. All units are front-connected and front-wired. Westinghouse Electric Corp., Box 868, Pittsburgh 30, Pa.

Bronze Valves

Diaphragm construction claimed to be stronger than found in usual, similar type bronze valves.

These 150-lb. valves, with "500 Brinnell" stainless steel seats and discs are being manufactured in sizes of ¼ through 2 inches and are available in globe and angle types, screwed ends. They are designed for all pressures up to 150 lb. saturated steam. Non-shock cold water, oil, or gas, 300 lb. Manning, Maxwell & Moore, Inc., Watertown 72, Mass.

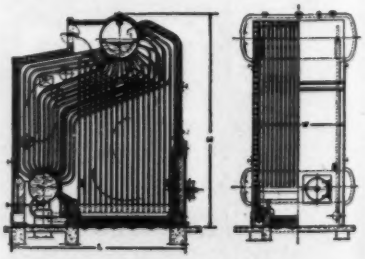
Diaphragm Control Valves

Useful on many vacuum applications.

Valves are designed primarily to handle corrosive fluids or gases or any slurry or fluid carrying solids in suspension which would plug the bowl of a double seated control valve or lodge in the guide section of a venturiflo (angle) valve. They are packless as a rubber or other plastic diaphragm is retained between the bonnet and valve body. Body is streamlined with no pockets and has a transverse weir. Tight shutoff is obtained when the diaphragm is brought firmly in contact with the weir. Valves can be supplied for normally open, normally closed or "on" and "off" action. Hammel-Dahl Co., 243 Richmond St., Providence 3, R. I.

Two Drum Boilers

Feature a compact and symmetrical bent tube design.



Designated as Type C, the two-drum water tube boilers range in capacities from 10,000 to 45,000 lb. of steam per hr., and are part of a program for simplifying selection and shortening delivery schedules for

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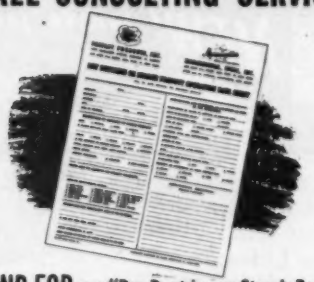

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boilers in this size range. Gases enter the tube bank across the entire width of the furnace. This full width flow is maintained through the entire unit. Temperature of gases at any particular section is practically uniform across the entire width. In sizes of 20,000 lb. and over, the furnace is completely water cooled. Below 20,000 lb. the design provides for side walls without water cooling. Springfield Boiler Co., 1901 E. Capitol Ave., Springfield, Ill.

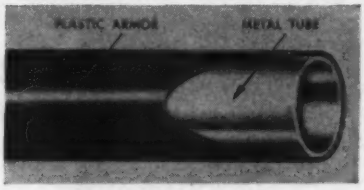
Heat Exchanger

Utilizes stainless steel to avoid contamination of fluids or corrosion by fluids.

All recent advancements in Ross thermal engineering are incorporated in the new SSCF exchangers, which are offered in a complete range of sizes tested to 450 psi to withstand most strenuous usage. Manufacturer states that immediate delivery and low unit cost is made possible by complete standardization and stocking of all component parts. Ross Heater & Mfg. Co., Inc., West & Forest Ave., Buffalo 13, N. Y.

Plastic Armored Metal Tubing

Has high corrosion resistant properties.



Designed for use as electrical conduit or for transmission of water, air or gas, the new product consists of almost any thermo plastic such as polyethylene, or cellulose accetate buterate, extruded over metal tubing of ferrous or nonferrous analysis. Present applications include electrical conduit in chemical, salt and other plants having corrosive atmospheres. Samuel Moore & Co., Dekoron Tubing Div., Mantua, Ohio.

Speedomax Recorder

Automatically plots relationship between 2 variables, showing one as a function of the other.

As compared to the usual recorder, fitted with only one measuring circuit and a constant speed non-reversing chart paper drive plotting variable as a function of time, this new recorder has two measuring circuits. Pen travel is controlled by the Speedomax G electronic circuit and a similar circuit controls the chart paper drive and makes it reversible. The unit makes it possible automatically to draw curves such as a hysteresis loop, temperature vs. temperature difference, stress vs. strain, or other two variable curves. Leeds & Northrop Co., 4934 Stenton Ave., Philadelphia 44, Pa.

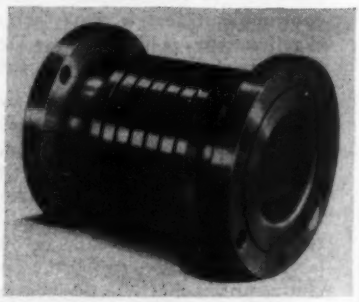
Protective Hand Cream

Claimed to guard skin pores against irritating causts of dermatitis.

A preventive purpose cream, designed to protect skin against paints, printing ink, lacquers, grease, grime and oil is said to be one of the few protective creams developed without harmful wax fillers. Called Glov-Cote, it is claimed that one application provides many hours of skin protection, and that it washes off even with cold water. As the coating dissolves it carries with it the paint, grease, ink or grime that gathers during normal working operations. Sample containers are available for trial use. Chase Chemical Co., 2901 Dover Ave., Cleveland 9, Ohio.

Expansion Joints

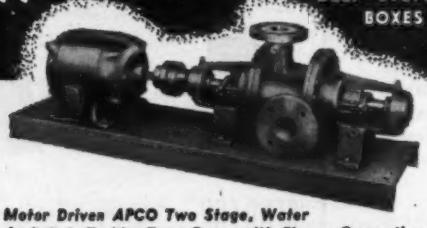
For axial, offset and radial motion control in high pressure piping systems.



CMH Flexoniflex joints consist of corrugated, bellows-type sections of stainless steel or other alloys formed within integral control rings and end sections. They are manufactured with single or multiple plies and may be lined or unlined depending on application. Temperature range is from sub-zero to 1400 F. for stainless steel. It is claimed that these units for the 1000 psi. working pressure range have been used successfully in critical confidential projects during the last several years. Chicago Metal Hose Corp., Maywood, Ill.

FOR HANDLING HIGH TEMPERATURE AND HIGHLY VOLATILE LIQUIDS

NEW! WATER JACKETED APCO with EXTRA DEEP STUFFING BOXES



Motor Driven APCO Two Stage, Water Jacketed, Turbine-Type Pump with Flange Connections.

SINGLE AND TWO STAGE
•
1750 R.P.M.
•
WIDE RANGE OF SIZES
•
FOR SCREW OR FLANGE CONNECTIONS

These notable pumps are made available "by request" of many of our engineer friends. Water jacketed APCO pumps were developed specifically for the efficient handling of high temperature and highly volatile liquids. They are designed to compensate for expansion and contraction due to heat. Because Apco's multi-vaned impeller handles vapor or air along with the liquid there can be no vapor lock within the pump. The cool liquid in the water jacket reduces the temperature of any liquid leakage through the extra deep stuffing boxes — thus flashing or vaporizing of the leakage is prevented. May be made of any machinable metal for handling corrosives. Requires but small amount of such special metal — with resultant economy. We invite your consideration of the many features of these fine pumps.

AURORA CENTRIFUGAL PUMPS

A complete line, notable for streamline coordination between impellers and shells, including Single and Two Stage Horizontally Split Case, Side Suction, Vertical, Non Clog, Sump, Mixed Flow, Special Design, etc.

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Briefs . . .

▸ CURRENT TRANSFORMERS — Indoor, type MR through-type current transformers for low-voltage metering indoors are designed for easy mounting in any position in a meter box or on a switchboard. Units are for operation up to 600V with primary current ratings of 200 or 400 amp. to 5 amp. Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa.

▸ WINDOW FAN—Serves as intake or exhaust fan in window, and as spot cooling fan anywhere. Universal window bracket permits installation in any standard sized window and power unit can be removed without tools, time or trouble. Fresh'nd-Aire Co., 221 No. LaSalle St., Chicago 1, Ill.

▸ STEEL SCOOPS—Made of stainless steel, these round-bottom scoops have smooth homogeneous butt welds by the heliarc process, using no fillerrod or flux. Corners are rounded and tubular handles are closed. Construction is designed to eliminate crevices, seams, joints or rough spots. Metalsmiths Div. of Orange Roller Bearing Co., Inc., 560 White St., Orange, N.J.

▸ DEAERATING HEATER—Two-stage deaerating heater reduces the oxygen content of boiler feedwater to less than 0.005 ml per liter measured by the ASTM Referee Method or Modified Winkler test regardless of rapid load variations or unusual operating conditions. Carbon dioxide is also removed. Graver Water Conditioning Co., 216 W. 14 St., New York 11, N.Y.

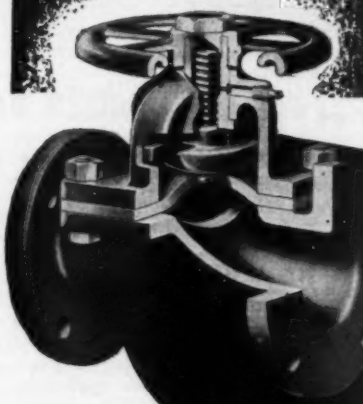
▸ BATTERY SERVICE KIT—Consists of steel tray with handle and compartments for holding battery servicing tools and water. Water jar is made of hard rubber. Will not tip over. General Scientific Equipment Co., 2700 W. Huntingdon St., Philadelphia 32, Pa.

▸ ION EXCHANGE RESINS—Development of Analytical Grade Amberlites meet the exacting requirements of laboratory workers in research and analytical studies, and give them a complete selection of exchangers for the removal of positively or negatively charged ions from clear solutions over the entire pH range. Rohm & Haas Co., Washington Square, Philadelphia 5, Pa.

▸ SINGLE PLUNGER VALVES—Employ a small solenoid travelling through only a ⅛ in. stroke to move a small pilot valve plunger to apply air to the operating piston to move the main valve plunger. It is claimed the design assures positive performance and much greater operating force than possible with a large direct connected solenoid. C. B. Hunt & Son, Inc., Salem, Ohio.

▸ MOLDED PAIL—Described as light, shock resistant, rigid, and almost chemically inert, this molded pail utilizes a virgin rubber base compound and other features for greater safety and serviceability in handling of acid and alkaline chemicals. Pouring lip reduces drip and molded tipper on bottom of pail provides a firm hold for accurate control in pouring. Stokes Molded Products, Inc., Trenton 4, N.J.

Now you can valve
66° Bé Sulphuric Acid
without leakage, dripping or sticking



HILLS-McCANNA
Diaphragm Valves
with L-1 PLASTIC DIAPHRAGMS

NEWLY developed plastic diaphragms for Hills-McCanna Diaphragm Valves now make it possible to handle 66° Bé sulphuric acid without leaking, dripping or sticking. The combination of the proved Saunders Patent pinch clamp principle with the new plastic diaphragm puts an end to these troubles so common in valving 66° Bé sulphuric.

Hills-McCanna Diaphragm Valves for handling 66° Bé sulphuric are suitable for temperatures up to 125° F., pressures up to 100 psi. To get complete information, price and delivery data, write today. Specify valve sizes (½" to 4" incl.) and body material (cast iron, cast steel, Durimet or glass lined) desired. Full explanation of the Saunders Patent principle and specifications for Hills-McCanna valves for other services are given in Catalog V-48, available on request. HILLS-McCANNA COMPANY, 2433 W. Nelson Street, Chicago 18, Illinois.

HILLS-McCANNA
diaphragm valves
saunders patent
Proportioning Pumps
Force-Feed Lubricators • Magnesium Alloy Castings

The Paper Industry New Literature

Books

NATIONAL ASSOCIATIONS OF THE UNITED STATES. By Jay Judkins, Chief of the Trade Association Division, and Helen E. Wells. Thirteenth of a series initiated by the Department in 1913. Available from Superintendent of Documents, Government Printing Office, Washington 25, D.C. 634 pages. $3.50.

Services and accomplishments of some 4,000 trade associations, professional societies, labor unions, farm co-operatives, chambers of commerce, better business bureaus, and other organizations are reviewed in three major parts comprising this directory: Part 1, Industry Sections, covers trade, professional, and other organizations arranged by industry groups; Part 2, Miscellaneous Sections, covers various types of organizations that are not susceptible to arrangement by industry groupings, but are of special importance in the economic and social life of the United States; Part 3, Other types of organizations, includes summarized text describing advertising, educational, engineering institutes, research, salesmen's, small business, and other organizations not covered in Parts 1 and 2; also trade association magazines, conventions, trade shows, and trade directories.

A statistical supplement contains summarized economic data with reference to standard sources.

Index of the organizations described or listed is so arranged that it enables the user to readily find any organization in a given industry or field. A feature of the handbook is information on the job-furnishing aspects of each field of American business.

A PICTORIAL HISTORY OF SCALES. Published by Detecto Scales, Inc., 540 Park Ave., Brooklyn 5, N.Y. Loose leaf, plastic bound. 112 pages. Free. Limited number of copies.

In commeration of its 50th anniversary, Detecto Scales has published this interesting pictorial story of antique scales from the earliest recorded history down to scales for the future. Illustrations are reproductions of paintings, drawings, and engravings depicting the scales in use by the people of each particular area. The explanatory note accompanying each illustration is printed in both English and Spanish.

As a practical and useful purpose for this book, the publishers added a calendar with a day-by-day diary for personal or business use.

AN INDEX OF NOMOGRAMS. Compiled and edited by Douglas Payne Adams. Published jointly by The Technology Press, Massachusetts Institute of Technology, and John Wiley & Sons, Inc., 440 4th Ave., New York 16, N.Y. 7½ x 10. 174 pages. $4.00.

Approximately 1,700 alignment diagram references in well-known periodicals are presented in this Index. The book is divided into two main parts, Index A—Key Words, and Index B—Master Index. In the first is an alphabetical list of key words which are associated with each of the diagrams. Following each entry is the key number permitting reference to Index B where the

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Complete, modern first-aid facilities help to keep our plant in continuous operation in order that your plant, too, may encounter no down-time.

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Asarco Sheet Lead ... All commercial weights and sizes. Chemical ... Tellurium Chemical ... Antimonial.

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Asarco Lead and Lead Lined Valves ... Split Type "Y" and "Angle", Standard "Y", Gate, Check, Hard Lead "Y", Plug and Seat.

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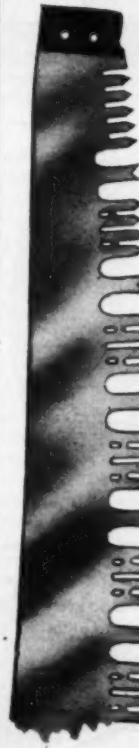

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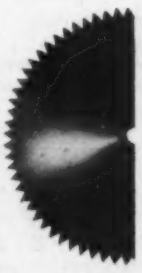

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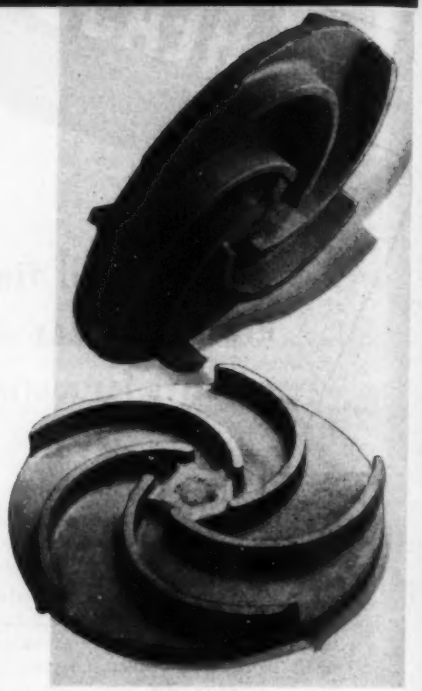

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periodical, date of issue, volume, number, and page number of the nomogram are listed. Variables employed in each diagram are given in a bracket following its title.

Abbreviations of all periodicals and variables used in the book are listed at the beginning of Index B.

WET STRENGTH PAPER. By T. T. Collins, Jr., Thilmany Pulp & Paper Co., and Alan Adrian, Neenah Paper Co. Published by Boyce Publishing Co., Inc., 220 E. 42nd St., New York 17, N. Y. Paper bound. 88 pages. $1.00.

Reprinted from the original presentation which appeared in *Paper Mill News*, this monograph reviews 410 references to the literature and patents on wet strength papers published prior to and through 1947. A discussion is given of the applications for wet strength papers and of methods used in testing wet strength papers. Reference is made to the various theories as to the causes of the phenomenon of wet strength.

THE ECONOMICS OF PULP AND PAPER. By John A. Guthrie. Published by The Bureau of Economic and Business Research, School of Economics and Business, The State College of Washington Press, Pullman, Wash. 6 x 9. 205 Pages. Cloth bound, $2.50. Paper bound, $1.50.

The purpose of this book is twofold: (1) to assemble and analyze the available economic data pertaining to this industry, and (2) to appraise its particular problems and trends. All important aspects of the economics of pulp and paper are examined, with special attention to regional cost and profit differences, as well as to the operation of interregional competition. Some attempt has been made to foresee future trends. Primarily, of course, the study surveys the development and outlook for the industry in the United States, especially the economic possibilities for the industry in the states of Washington, Oregon, and California. There are 41 tables and 18 charts.

The author has considered several problems of special interest to theoretical economists, and makes an objective appraisal of such controversial subjects as the tariff, attempts at price restriction, and the recent basing point decision.

Booklets and Pamphlets

1949 ANNUAL REVIEW. Published by Allis-Chalmers Mfg. Co., Box 512, Milwaukee 1, Wis. 40 pages. This review outlines Allis-Chalmers activities, and development and application of its equipment to industry.

ON THE BEAM! . . . A GUIDE FOR PLANNING YOUR WORK. Published by National Foreman's Institute, Inc., Deep River, Conn. 30 pages. Pocket-size 25c. Planning rules and principles shown in this booklet apply to janitor, typist, machinist or president. Examples cited deal mostly with machine jobs, but inasmuch as everyone has to use some equipment in his work, it is suggested that the reader try to see the rules and methods in terms of his particular job. Illustrated with sketches.

A SERVICE TO INDUSTRY. Published by Department of Industrial Co-operation, University of Maine, Orono, Maine. 16 pages. To aid in expansion of the program of industrial co-operation, this pamphlet presents a plan in which the research staff and facilities of the University of Maine are made available to industry.

SIXTH REPORT TO CONGRESS OF THE ECONOMIC COOPERATION ADMINISTRATION. Available from Superintendent of Document, U. S. Government Printing Office, Washington 25, D. C. 140 pages. 35c a copy. Six chapters cover progress of European recovery, cooperative programs of the participating countries, ECA programs for Europe, ECA and the United States economy, China Aid program and Korea Aid program. Appendixes include Agreement for Intro-European Payments and Compensations for 1949-50, Statistical Indicators of Recovery Progress in Western Europe, ECA-Financed Supply Program for Europe, Counterpart Funds, Status of the United States Foreign Relief Program (Public Law 84) and the United States Foreign Aid Program (Public Law 389), and Fiscal Statements.

STRATEGY FOR TRUE LIBERALS. By Robert E. Wilson. Available from Public Relations Department, Standard Oil Co.

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(Ind.), 910 So. Michigan Ave., Chicago, Ill. Limited number of copies available. The author defines a true liberal as the man who fights for freedom, and points out that the strategy used today by the Socialistically inclined bureaucrats is leading toward anything but freedom. The true liberals are told what to do and how to help avert this threat. Food for thought to those who tend to believe, or are led to believe, our present day government leaders are liberals.

CANADIAN FOREST POLICIES ARE ALL WRONG. Privately published by author, John D. Gilmour. 19 pages with tables, illustrations and comprehensive summary. A vigorous attack against present government forestry management in Canada, with supporting quotations and examples, followed by 7 apparently all-inclusive recommendations for advantageous solutions to the alleged ill-effects of government control. Clearly and logically written, the booklet gives thought-provoking, though perhaps controversial, ideas about forestry.

HOW MONEY GROWS ON TREES. Published by International Paper Co., Southern Kraft Division, Mobile, Ala. 15 comic-strip pages. Designed for distribution to schools, this booklet presents in an unusual and interesting manner the basic facts concerning tree farming and forest conservation. The colored text is complete with a teaching manual and suggestions on how to best get the booklet into adult hands.

Manufactures' Publications

Through the co-operation of manufacturers and suppliers, THE PAPER INDUSTRY lists the following catalogues, bulletins, and booklets. They may be obtained without cost or obligation, unless otherwise specified, by writing direct to the manufacturers. Please address requests on your company letterhead.

Iron-clad Concrete Floors. The Master Builders Co., Cleveland 3, Ohio—36-page booklet entitled "The Masterplate Iron-Clad Concrete Floor" gives information on the product and method which produce nine features most important in industrial, commercial and institutional floors. Job pictures show a few of the many Masterplate floors in service. Detailed illustrated directions for laying the floor are given for both new construction and resurfacing old floors. Color chart included.

Rotary Vacuum Filtration. Filtration Engineers, Inc., 155 Oraton St., Newark 4, N. J. —24 page two-color Bulletin 103 outlines the principles of continuous rotary vacuum filtration, gives technical details of the FEinc rotary vacuum filter with the FEinc string discharge, and shows how filter speeds continuous processes of many industries. Included are cutaway view of discharge filter, details of automatic valve, general construction specifications, and typical installation diagrams. Illustrated with photographs.

Analytical Service. Skinner & Sherman, Inc., 246 Stuart St., Boston 16, Mass.—3-way folder entitled "Integrity in Analysis" outlines the service available through this company, plus information on its background, laboratory facilities and personnel. Laboratory activities are listed. Photographs of different departments are shown.

Adhesives. National Adhesives, 270 Madison Ave., New York 16, N. Y.—18 page booklet entitled "How to Handle Adhesives For Transparent Films" contains a complete chart of commonly used transparent films, discusses three general types of adhesive formulations for bonding films, and covers special problems. Other informative adhesive booklets are listed and briefly described.

Fluorescent Lamp Guards. Den-El Equipment Co., 271 Conklin Ave., Hillside, N. J.—2-way folder describes and illustrates Den-El, fluorescent lamp guards, for prevention of falling lamp accidents. Prices are listed.

Air Conditioning. Niagara Blower Co., 405 Lexington Ave., New York 17, N. Y.—2 page Bulletin No. 112 describes controlled humidity method of air conditioning. Illustrated with photographs and flow diagram.

Fork Truck. Yale & Towne Mfg. Co., Philadelphia 15, Pa.—Bulletin P-1180 describes the straddle-type electric fork-truck designed for use with wing-type pallets. Illustrations, line drawings, and specifications are shown.

Heating Equipment. Dravo Corp., Fifth and Liberty Aves., Pittsburgh 22, Pa.—Bulletin 520 describes the "Counterflo" heaters which replace, or make up, the air exhausted from industrial structures. Illustrated.

Tank Heating and Cooling. Kold-Hold Mfg. Co., Lansing, Mich.—6 page bulletin describes and illustrates tank heating and cooling. Comparison is made between the platecoil and pipe coil methods of heat exchange. Ten advantages of platecoil are described.

Fire-Retardant Paint. Flame-Seal Corp. of Ill., 230 No. Canal St., Chicago, Ill.—Illustrated circular contains pertinent information about Flame-Seal, a fire-retardant paint and coating which, it is claimed, will not burn and will retard flame spread.

Welding Alloys. Eutectic Welding Alloys Corp., 40 Worth St., New York 13, N. Y.—

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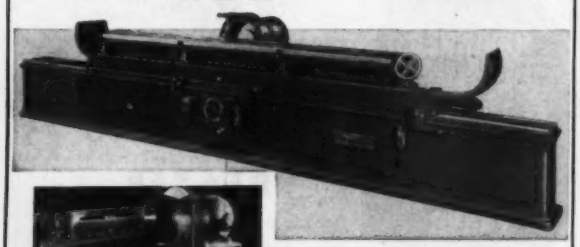

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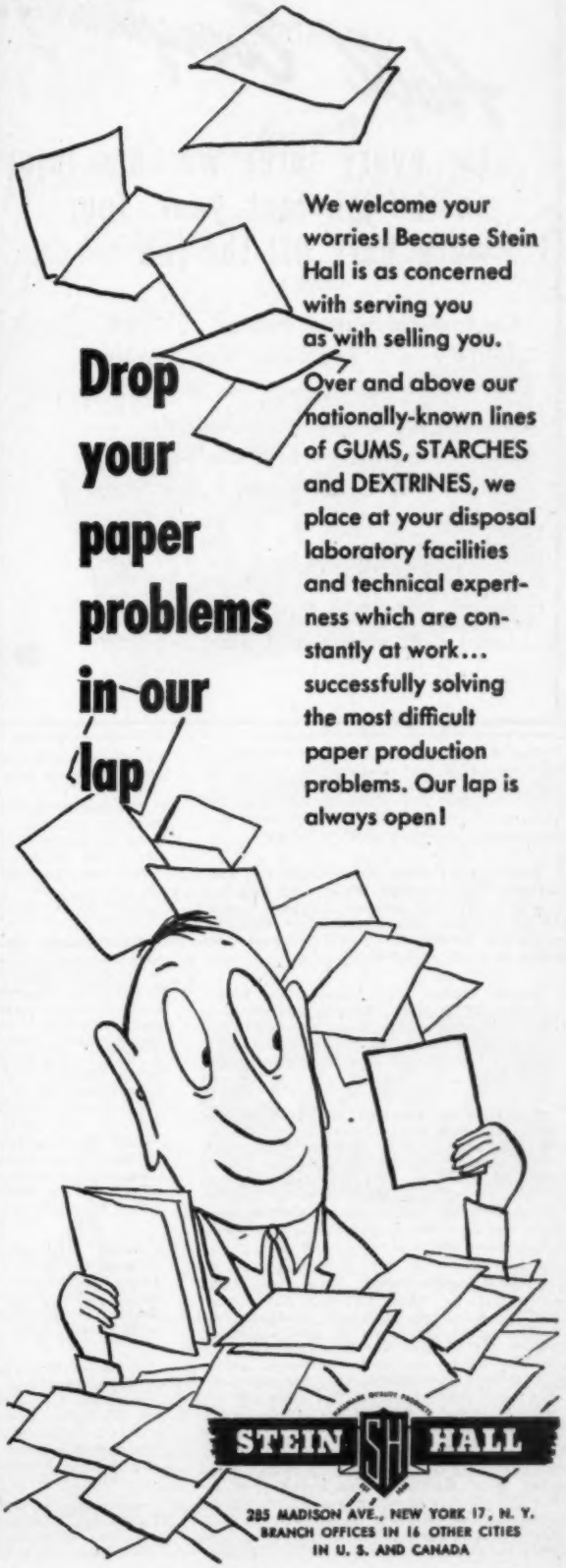
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Centrifugal Pumps. The LaBour Co., Inc., Elkhart, Ind.—16 page Bulletin 53 describes and illustrates this company's Type G pumps. Parts drawings and identification lists, instructions for installation and care, and operating care are included.

Doctor Blades. The International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.—Bulletin entitled "How to Get More Production from Doctor Blades" describes blades made of "K" monel, a nickel-copper alloy. Illustrated.

Bearings and Castings. National Bearing Div., American Brake Shoe Co., St. Louis, Mo.—28 page booklet gives physical properties and comparative specifications for 27 different bronze alloys and 5 aluminum and manganese bronzes. Outlines many applications of bronze. Babbitt metals, their descriptions and uses, are discussed. Illustrated with pictures and charts.

General Service Valves. Everlasting Valve Co., 49 Fisk St., Jersey City 5, N. J.—14 page Bulletin E-160 describes and illustrates the design and construction of quick-operating valves for general service. Application to blow-off service and on fire protection, chemical process, soot blower, water column blowdown and other types of pipe lines are explained. Included are tables of dimensions, weights and list prices.

Centrifugal Fire Pumps. Peerless Pump Div., Food Machinery and Chemical Corp., 301 W. Ave. 26, Los Angeles 31, Calif.—24 page Bulletin B-1500 describes two basic types of centrifugal fire pumps, together with selection charts, necessary fittings and application data. Dimension drawings and dimensional data are given. Illustrated.

Lubrication Devices. Trico Fuse Mfg. Co., 2948 N. 5th Ave., Milwaukee 12, Wis.—4-page broadside 4800-OB describes and pictures this company's line of lubrication devices, and contains application suggestions on how the waste, dangers and guesswork of "trust-to-luck" hand-oiling can be eliminated.

Gas Pumps. Roots-Connersville Blower Corp., Connersville, Ind.—8 page Bulletin 31-B-17 covers Type XA gas pumps used as boosters or exhausters in a wide range of industrial and other applications. Discusses the advantages of the rotary positive principle. Sectional views are included along with a chart to graphically illustrate volume and power characteristics of constant pressure and variable-speed, multi-speed, or constant-speed drives. Illustrated.

Roll Handling Trucks. Elwell-Parker Electric Co., Cleveland, Ohio—8 page bulletin describes and illustrates clamp trucks for handling rolls of paper. Photographs showing actual operation are included.

Speed Variator. General Electric Co., Schenectady 5, N. Y.—8 page Bulletin GEA-5336 describes and illustrates the electronic speed variator for controlling speeds for grinders, superfinishers, paper machines, winders, etc. Features are given.

Infra-red Analyzer. Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.—4 page illustrated Bulletin No. DZ-4 describes the Lira infra-red gas and liquid analyzer for measuring atmospheric contamination and precise process control. Schematic arrangement is included.

Electronic Controls. Photoswitch Inc., Cambridge, Mass.—62 page Bulletin PG 4910 describes industrial control problems which have been solved through the use of electronics. Applications have been chosen from many installations because of general interest and because each will suggest related uses in other fields. Index lists applications both alphabetically and by industries.

Processing Equipment. Pulverising Machinery Co., 240 Chatham Rd., Summit, N. J.—50 page booklet contains a complete line of grinding and dust collecting equipment and their wide use and applications in the production and handling of fine and ultra-fine powders of a great variety of materials. Mikro-pulverizers, -collectors, -atomizers, and plan for processing efficiency are described. List of prominent users of this equipment, and special accessories for same, are included. Illustrated.

Adjustable Speeds. General Electric Co., Schenectady 5, N. Y.—4 publications on adjustable speed are GEA-5334, GEA-4883A, GEA-5335, and GEA-5337. The first of these bulletins is a 24-page, two color booklet which provides a check list of points to consider in selecting an adjustable speed drive, range of application and performance features. Illustrated with photographs, charts, and diagrams. GEA-4883A covers adjustable-speed ACA motors; GEA-5335, speed variator; and, GEA-5337, "Thy-Mo-Trol" adjustable-speed drives. These three bulletins are printed in two colors, and contain descriptive and application data for specific equipments involved, including features, advantages, operating characteristics, and ratings. All are illustrated.

Freight Elevators. Elevator Div., Westinghouse Electric Corp., Jersey City, N. J.—44 page Booklet D-4402 contains ten illustrated sections that explain the basic considerations involved when selecting freight elevators and component parts of freight elevators.

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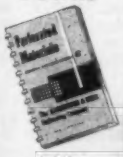

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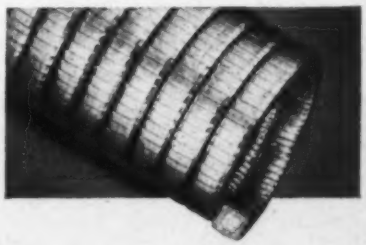

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This section offers a quick and direct method of contacting professional and business service consultants.

Ohio—4 page technical chart emphasizes versatility, strength and dependability of steel castings. Essential data include indicated engineering and design applications, current specifications, and typical specifications for especial tensile grade requirements.

Chemical Pumps. Worthington Pump and Machinery Corp., Harrison, N. J.—12 page Bulletin W-350-B11 describes and illustrates centrifugal pumping equipment used in chemical process industries. Complete explanation of the Worthington mechanical seal designed to prevent leakage of corrosive liquids is given, and Worthite, corrosion resistant metal, is described. Illustrated.

Diesel Engines. Superior Engine Div., The National Supply Co., Springfield, Ohio—20 page Bulletin No. 4812 describes and illustrates diesel engines, and features 60 years of engine research and production development, and numerous installations within the past three years in municipal power plants, industrial power plants, and others. Included are 100 engine specifications. Illustrated with photographs.

Starting Switch. General Electric Co., Schenectady 5, N. Y.—4 page Bulletin GEA-1522F describes and illustrates the manual motor-starting switch. Dimensions and ratings are given.

Direct Fired Heating. Thermobloc Div. Prat-Daniel Corp., East Port Chester, Conn. —Bulletin Data file 901 contains complete catalogue descriptions of self-contained direct fired industrial heating units, and provides data tables for computing heat loss and figuring heat requirements. Tables on outdoor design temperatures, common types of industrial construction, heat losses through window and door infiltration and a table on heating constants are included.

Industrial Brushes. M. W. Jenkins' Sons, Inc., Cedar Grove, Essex Co., N. J.—12 page Bulletin No. 10 describes and illustrates cylinder brushes. Brushes for applying, arranging and removing are discussed. Included is a guide for brush selection.

Process Mills. Troy Engine & Machine Co., Troy, Pa.—4 2-page bulletins describe and illustrate the "one-point" adjustment high speed three roll mill, which eliminates human element in setting of rolls for grinding; four point adjustment high speed three roll mill; high-speed small production mill; and triple action colloid mill for more uniform dispersions and emulsions.

Coatings. Brooklyn Varnish Mfg. Co., 50 Jay St., Brooklyn 1, N. Y.—4-page pamphlet, Vol. II, No. 12, entitled "The Coating Corner" contains short articles on transparent Glo-Dur coating for glass, precautions to be used when applying fungicide coatings, descriptions of Tuf-On P-36 Zinc Chromate Primer and its applications for combating corrosion, and Tuf-On No. 58 Clear Coating for moisture proofing and chemical resistance problems.

Compressors. Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.—16-page Bulletin No. A-56 includes facts regarding WL-80 Unitair compressors, together with an easy-to-use selector chart, detailed section drawings and parts photographs illustrating economy and operating features.

Vinyl Butyral Resins. Bakelite Corp., 300 Madison Ave., New York 17, N. Y.—22-page booklet entitled "Vinylite-Vinyl Butyral Resins" describes vinyl butyral resins. Included in the text matter are general properties, compatibility and solubility, applications, recent development of wash primer type of metal conditioner and types of wash primers, together with formulations. Charts and tables are included.

Control Centers. Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa.—Booklet B-4213 discusses safety features of standardized control centers. Included are sections on how to plan a control center, dimensional table on weights of starter and other interchangeable units, and reference tables for selection of starter sizes.

Locomotive Crane. American Hoist and Derrick Co., St. Paul 4, Minn.—4-page brochure highlights the 25 ton DiesElectric Locomotive Crane, designated as American Model 825 DE. Illustrated with photographs. Specifications included.

Acid and Alkali Proof Coatings. Maurice A. Knight Co., Kelly Ave., Akron 6, Ohio—8-page Bulletin No. 3N furnishes information regarding characteristics, instructions for applying, and typical users of Pyroflex lacquer, a special surface coating material developed to withstand extremely severe corrosive conditions.

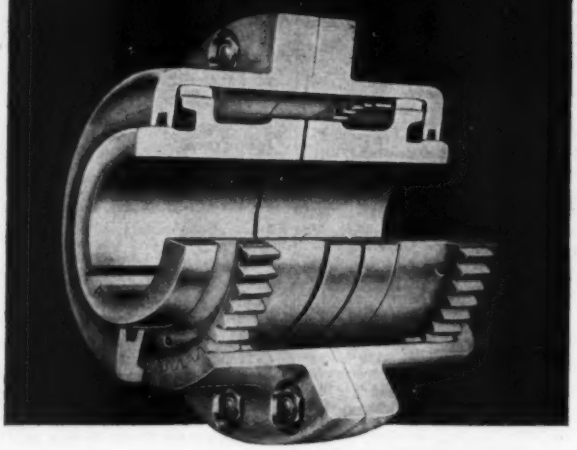
Electronic Voice of Safety. 4-page bulletin describes and illustrates the Saf-T-Vox for recording and reproducing safety messages, enabling the safety man to deliver his verbal warning at the danger point before the danger moment. Photographs of actual use are shown.

Chlorine Handling Safety Chart. Heavy Chemicals Div., The Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa. —14 x 19 in. wall chart printed in green and black on linen backed paper provides suggestions on employee protection, equipment maintenance precautions in locating leaks, and first aid suggestions, based upon accident-prevention experience of this company in the handling of liquid chlorine.

Multi-Layer Pressure Vessels. A. O. Smith Corp., Milwaukee, Wis.—8-page Bulletin No. V-52 describes the construction, manufacture and assembly of multi-layer pressure vessels for industrial processes.

Air Compressor. The Nash Engineering Co., So. Norwalk, Conn.—8-page Bulletin No. P-S-L-374 describes and illustrates the instrument air compressors used where clean compressed air is a necessity in chemical and process industries. Dimensions and capacity tables included.

POOLE



A COPY OF CATALOG GIVING FULL DESCRIPTION AND ENGINEERING DATA SENT UPON REQUEST.

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POOLE FOUNDRY & MACHINE COMPANY WOODBERRY, BALTIMORE, MD.

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MADE BY

H. WATERBURY & SONS CO.

ORISKANY, N. Y.

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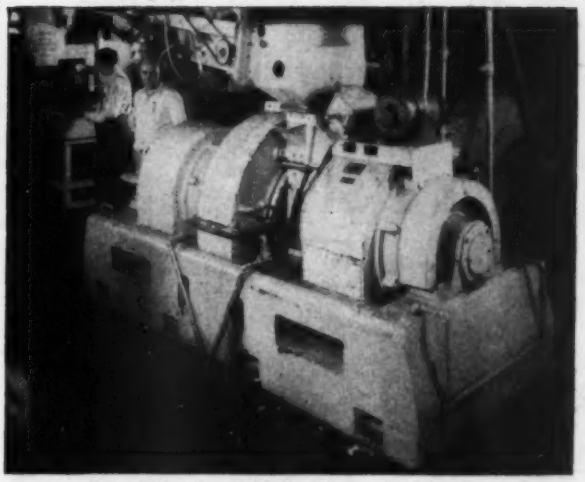


Bauer Pulp Refiner with special controls and meters

FIBER PRODUCTS LABORATORY

at your service

Located on our premises, the Fiber Products Laboratory is sponsored by six suppliers of equipment and services for fiber-using industries.

The laboratory is operated by trained technicians. Hundreds of tests are made annually on commercial size machinery supplemented with chemical and physical testing apparatus. Detailed confidential reports are submitted to clients.

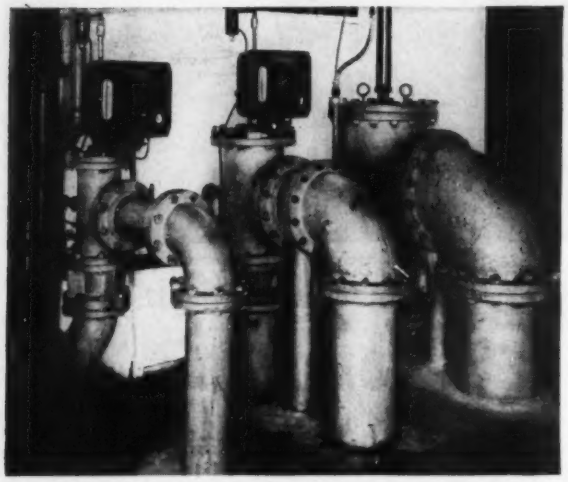
If you have pulping and processing problems, you are invited to find out how the Fiber Products Laboratory can assist you. An interesting booklet on the subject is available upon request.

THE BAUER BROS. CO.

Springfield 99, Ohio

Test runs can be translated into regular mill production

Paper Machine Furnish Now Completely Controlled by new F & P STOCK-RATOR



Broke, sulfite, and groundwood meters in a mill of the Ontario Paper Company. Sulfite flow rate is set by paper machine demand as reflected in machine chest level. Groundwood, color, alum, and carbonate are proportioned to sulfite flow rate. Broke flow is under manual control.

The flows of chemical and mechanical pulps, broke, alum, carbonate, clay, color, resin, size, and other materials are accurately continuously measured, and proportioned by F&P STOCK-RATOR systems. Control is based either on paper machine speed or on the flow of any one of these materials.

Major advantages are significant savings in costly furnish, less sheet breakage on the paper machine, and uniform quality. The system requires neither head-boxes nor pulp return lines. Stock chest level is controlled, and pulp flow rates can be recorded and totalized at low additional cost.

Mill records show that installations have been paid for out of savings in less than six months, primarily through precise control of chemical to mechanical pulp ratios.

The flow of molten sulfur, black liquor, cooking liquid, bleach, and other materials used in the Paper Industry can also be measured, indicated, recorded, proportioned and totalized by simple, accurate F&P instruments.

CLIP COUPON—MAIL TODAY!

Please send me Technical Bulletin, "New Developments in Pulp & Paper Mill Instrumentation."

NAME ..... POSITION .....

COMPANY .....

STREET .....

CITY ..... STATE .....

FISCHER & PORTER COMPANY

Dept. OQ-IF Hatboro, Pennsylvania

PROCESS CONTROL INSTRUMENTS

MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

Quotations to consuming mills, cents per pound or dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.
Blue Overalls	6.50 to 6.75
Corduroy, Men's	3.75 to 4.00
Corduroy, Ladies'	3.75 to 4.00
Washables, No. 1	3.00 to 3.25
Percales	6.00 to 6.25
Light Prints, No. 1	5.50 to 5.75
Khaki Cuttings—	
Bleachable	4.50 to 4.75
Unbleachable	4.00 to 4.25
New White Canvas	11.00 to 11.50
New Mixed Blacks	3.50 to 3.75
Canton Flannels, Bleached	10.75 to 11.00
Shirt Cuttings—	
New White No. 1	11.00 to 11.25
White Shrunk	10.25 to 10.75
Silesias No. 1	7.25 to 7.75
New Unbleached	11.00 to 11.25
Fancy	5.25 to 5.50
Linen Cuttings—	
American	8.00 to 8.25
White	14.00 to 15.00
Grey	13.50 to 14.00

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.
Roofing—	
No. 1	1.30 to 1.40
No. 2	1.20 to 1.30
No. 3 and No. 4	.85 to 1.05
Twos and Blues—	
Repacked	3.00 to 3.25
Thirds and Blues—	
Repacked	2.75 to 3.00
Miscellaneous	2.25 to 2.50
Whites, No. 1—	
Repacked	4.50 to 4.75
Miscellaneous	3.25 to 3.50
White, No. 2—	
Repacked	3.25 to 3.50
Miscellaneous	2.75 to 3.00

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings New Mixed Cuttings New Light Silesias Light Flannelettes Unbleached Cuttings New White Cuttings New Light Oxfords New Light Prints	Nominal

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens No. 2 White Linens No. 3 White Linens No. 4 White Linens No. 1 White Cottons No. 2 White Cottons No. 3 White Cottons No. 4 White Cottons Extra Light Prints Ord. Light Prints Med. Light Prints Dutch Blue Cottons French Blue Cottons French Blue Linens Checks and Blues Linsey Garments Dark Cottons Old Shopperies	Nominal

ROPE and BAGGING

f.o.b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	5.75 to 6.00
Domestic	6.50 to 6.75
Wool Tares—	
Light	6.50 to 7.00
Heavy	7.00 to 7.50
No. 1 Scrap Bagging	5.25 to 5.50
Manila Rope—	
No. 1 large	5.50 to 5.75
No. 1 small	4.50 to 4.75
Sisal Rope—	
No. 1 large	5.00 to 5.25
No. 1 small	4.50 to 4.75
New Burlap Cuttings	6.75 to 7.25
Jute Threads—	
Foreign (Nom.)	6.50 to 7.00
Domestic	6.00 to 6.50
Strings—	
No. 1 sisal	4.50 to 4.75
No. 2 sisal	4.00 to 4.25
Soft jute	4.25 to 4.50
Mixed	2.50 to 2.75

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

Shavings—	per ton
Hard White Env. Cuts.	95.00 to 100.00
Hard White, No. 1	75.00 to 80.00
Soft White No. 1	70.00 to 75.00
Soft White, one-cut	85.00 to 90.00
Soft White, Misc.	60.00 to 65.00
Fly Leaf, No. 1	30.00 to 32.50
Fly Leaf, Woody No. 1	22.50 to 25.00
No. 2 Mixed Col. Woody	17.50 to 20.00
Flat Stock—	
No. 1 Heavy Books and Magazines, Repacked	25.00 to 27.00
Mixed Books	13.00 to 14.00
Ledger Stock—	
No. 1 white	40.00 to 45.00
No. 1 Mixed (Colored)	32.50 to 35.00
Manilas—	
New Env. Cuttings	60.00 to 65.00
New Env. Cuts, One-Cut	—
Extra Manilas	35.00 to 40.00
Manila Tab Cards, Free of Ground Wood	65.00 to 70.00
Colored Manila Tab Cards	35.00 to 40.00
Kraft—	
New Envelope Cuttings	60.00 to 65.00
Tripled Sorted No. 1 100%	30.00 to 35.00
New 100% Cor. Cuts	30.00 to 35.00
No. 1 Old Assorted	25.00 to 27.50
News—	
White Blank	55.00 to 60.00
Overissues	15.00 to 16.00
No. 1 Folded	10.00 to 11.00
Old Corrugated Containers	15.00 to 16.00
New Jute Corrugated Cuts	20.00 to 22.00
Mill Wrappers	10.00 to 11.00
Box Board Chips	7.00 to 8.00
No. 1 Mixed Paper	7.00 to 8.00

CHEMICALS

f.o.b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.05—
Ground, cwt.	3.80—
Powdered, cwt.	4.20—
Blanc Fixe—	
Pulp, bulk, ton	80.00—
Dry, barrels	85.00—
Bleaching Powder—	
Drums, cwt.	4.50 to 5.00
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	22.50 to 23.50
Argentine, lb.	20.50 to 21.00
China Clay—	
Domestic Filler	
Bulk (mine) ton	10.00 to 15.00
Domestic Coating	
Bulk (mine) ton	15.00 to 25.00
Imported (ship side)	
Bulk (lump) ton	22.00 to 30.00
Chlorine—	
Tank cars (wks) cwt.	2.40 to 2.70
Gelatine (silicin), lb.	1.25 to 1.35
Glyc. (C.P.) drums, lb.	.24¾ to .25¼
Litharge, powd. bbl. lb.	.12½ to .13
Rosin (Gum)—	New York, per 100 lbs.
F	6.85—
F	6.85—
G	6.85—
WWX	7.40—
Rosin (Wood), carlots, F.O.B. South	5.00—

MARKET QUOTATIONS

Salt Cake—
Dom. bulk (wks) ton..... 22.00 to 24.00
Imp. bulks on dock—
(Atl. ports) ton (Nom.) 25.00—

Soda Ash—
Bulk (works), cwt..... 1.00 to 1.15
Paper Bags, cwt. ..... 1.25 to 1.35

Soda (Caustic)—
Solid drums, cwt. ..... 2.05 to 2.10
Ground and flake, drums, cwt. ..... 2.45 to 2.50

Sodium Silicate—
60 deg. 55 gal. drums, (works) cwt. ..... 1.25 to 1.50
40 deg. 35 gal. drums, (works), cwt. ..... .80 to 1.05

Starch—
Pearl, 140 lb. bags, cwt.... 4.87—
Pearl, barrels, cwt..... 4.87—
Paper, (Sp.) bags, cwt..... 4.87—
Powdered, barrels, cwt..... 4.95—

Sulphur (Crude)
(Mine) bulk, long ton..... 18.00—

Talc—
Dom. 100 lb. bags (mine) ton ..... 22.00 to 28.00
Canadian ..... 35.00 to 45.00

Titanium Dioxide—
Barium Pig, bbls., lb..... .19½ to .21
Calcium Pig, bbls., lb..... .19½ to .21

Zinc Sulphide, bbls., lb. ..... 11.50 to 11.75

WOOD PULP

Prices, dollars per short, air dry, ton, with inland freight allowed, are:

Bleached sulphite, Swed... 118.00—
Bleached sulphite, Finnish 118.00—
Bleached sulphite, dom..... 118.00—
Easy bleaching sulphite.... —
Unbleached kraft, Finn..... —
Unbleached sulphite, Swed. 100.00—
Unbleached sulphite, Fin... —
Unbleached sulphite, dom. 100.00—
Unbleached kraft, Swedish 82.50—
Unbleached kraft, northern 82.50—
Unbleached kraft, southern 80.00—
Bleached sulphate, Swedish 126.00 to 128.00
Bleached soda, domestic.... 115.00—
Sulphite screenings, dom. 40.00 to 50.00
Sulphate screenings, dom. 40.00 to 50.00
Groundwood, domestic and Canadian ..... 65.00 to 67.50

PAPER

f.o.b. New York City

Boards—	per ton
Binders	100.00—
Chip	70.00—
Chip, tube and can	75.00—
Chip, full blending	77.50—
Chip, sgl. mla. lined	77.50—
Coated, white patent .018	110.00—
.020 and heavier	100.00—
Kraft liner	95.00 to 100.00
Filled News	72.50—
Container	85.00—

Book Papers—f.o.b. mill with quantity, weight, manufacturing and other differentials allowed:

(Per cwt. in ton lots)
Uncoated (Untrimmed)

Book, White (M. F.)—
A Grade E. F. ..... 15.65—
B Grade E.F. ..... 14.90—
A Grade S. C. ..... 15.90—
B Grade S. C. ..... 15.40—
No. 2 Uncoated Offset 4 sides, White —
Machine Coated White (Trimmed 4 sides)
No. 1 Glossy ..... 19.75—
No. 2 Glossy ..... 19.25—
No. 3 Glossy ..... 17.75—
No. 4 Glossy ..... —
No. 2 Offset ..... 15.15—
C1S Litho (Varnish) ..... —
C1S Litho (Non-Varnish) ..... —

Writing Papers—f.o.b. mill with zone, quantity, packing and other differentials allowed:

Rag Content Bond—
(In Ton Lots)

	per cwt.
Extra 100% Rag	54.45—
100% Rag	47.05—
75% Rag	36.15—
50% Rag	30.50—
25% Rag	25.75—

Rag Content Ledger—
(In Ton Lots)

	per cwt.
Extra 100% Rag	55.70—
100% Rag	48.30—
75% Rag	37.65—
50% Rag	30.70—
25% Rag	27.80—

Sulphite Bond—

	per cwt.
Air dry, watermarked	—
No. 1 watermarked	17.70—
No. 2 watermarked	16.75—
No. 4 watermarked	15.75—

Sulphite Ledger—

	per cwt.
No. 1 watermarked	19.00—
No. 2 watermarked	18.20—
No. 4 watermarked	17.65—

Glassine (f.o.b. mill)—

	per cwt.
Embossed (25 lb. up)	—
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—
Greaseproof—	
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—

News—

	per ton
Rolls, Standard Contract)	102.00 to 103.00
Rolls (Spot)	(Nominal)
Sheets	110.00—

Tissues (Carlots)—

	per ream
White No. 1	1.55—
White No. 2	1.20—
Bleached Anti-Tarnish	—
Colored	—
Anti-Tarnish Kraft	1.37½—
Manila	1.00—
Napkins, semi-crepe (12½ lb. to M shts.) per ca.	.80—
Napkins, full crepe and emb'sed (12½ lb. to M shts.) per ca.	.80—
Toilet, Bleached (M. shts.) per ca.	6.95—
Toilet, Unbleached (M. shts.) per ca.	5.75—

Towels—

	per case
Bleached	5.25—
Unbleached	4.50—

Wrappings (Kraft)—

	per cwt.
Super-Standard	8.00 to 8.50
No. 1 Wrapping	7.25 to 7.50
Standard Wrapping	6.50 to 6.75
Standard Bag	6.25 to 6.50
Variety Bag	—

Wrappings (Sulphite and Bleached Kraft)—
(Rolls, f.o.b. mill)

Bleached Papers—

	per cwt.
M.F. & M.G. Waxing, 20 lb. (Carloads only)	—
(10,000 lb.)	—
Drug wrapp., 25 lb.	—

Unbleached Papers—

Com. Gr. Butch. 40 lb.	—
No. 1 Butchers	—
No. 1 Imit. Parch. & Dry Fin. Groc. Sulphite, 30 lb.	—
No. 2 Imit. Parch. & Dry Fin. Groc. Sulphite, 30 lb.	—
Steam Finish, 50 lb.	—
Water Finish, 50 lb.	—

Manilas—

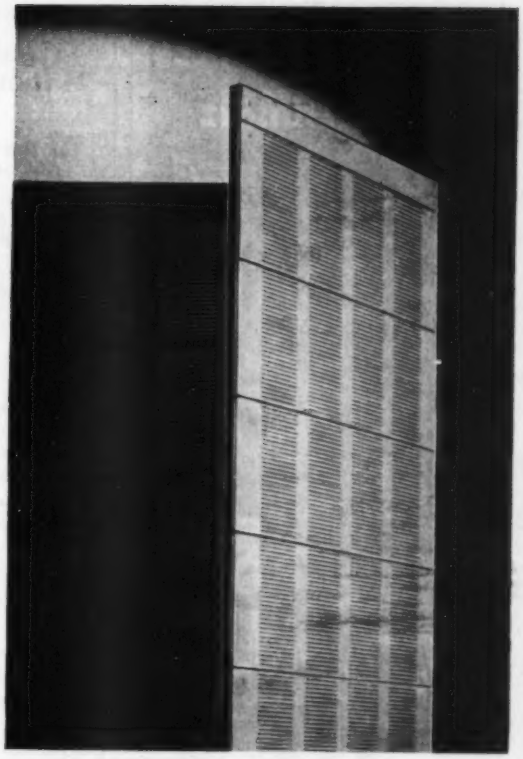
Envp. Mla., Sub. 16-40 (No. 1)	—
Envp. Mla., Sub. 16-28 (No. 2)	—
Envp. Mla. (Prices based on large sheets untrim'd ream marked, in bdls.)	—

Wrapp Mla. 35 lb. up—

No. 1	—
No. 2	—

M.G. Sulphite and Kraft (other than Waxing)

Grade B20 lb.	—
Grade A-22 lb.	—



3 Good Reasons Why

28,000 FABRICATED SCREEN PLATES

Are Now In Service

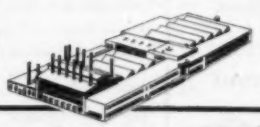
"Hardy" fabricated screen plates, made by Magnus, have a high-strength, thin-sheet design — specially engineered for maximum flow. That's why you're sure of these 3 service-proved advantages:

(1) **Increased Plate Capacity** — The thin sheet eliminates relief milling, and with recommended arrangement, substantially increases capacity per plate.

(2) **Longer Life** — Slots remain sharp, side walls highly polished for the life of the plate. There's greatly improved corrosion resistance.

(3) **High, Sustained Yield** — You get consistent, uniform quantities of cleaner pulp.

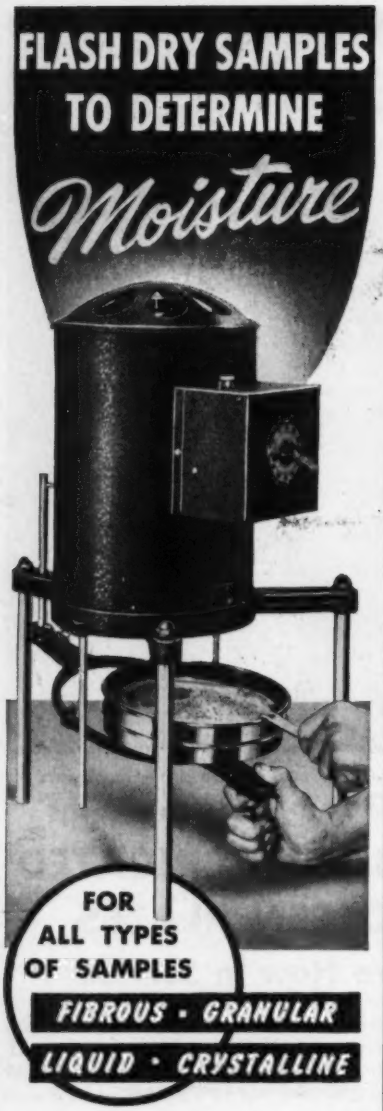
It all adds up to improved performance at reduced operating costs. Complete information is yours on request. Or if you like, we'll gladly have an engineer call.



MAGNUS METAL CORPORATION
FITCHBURG, MASSACHUSETTS

Metalworkers for the Paper Trade

SCREEN PLATES: BRONZE, CHROME-NICKEL-STEEL, AND INCONEL
VALVES: GATE, SWING CHECK, BLOW, GLOBE, ANGLE AND "Y"



Samples of your materials can be dried and tested for moisture content in a matter of a *few minutes.* You will save valuable processing time, reduce rejections, and improve product quality, when you install a DIETERT-DETROIT MOISTURE TELLER.

The moisture test is made in exact moisture percentage and test results will check exactly with the standard oven test. No corrections or calibrations are necessary.

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HARRY W. DIETERT COMPANY
9330 ROSELAWN • DETROIT 4, MICH.

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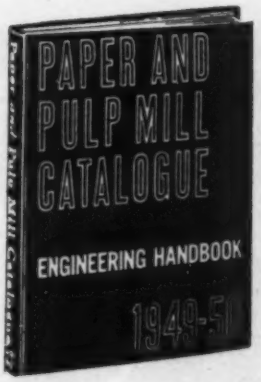

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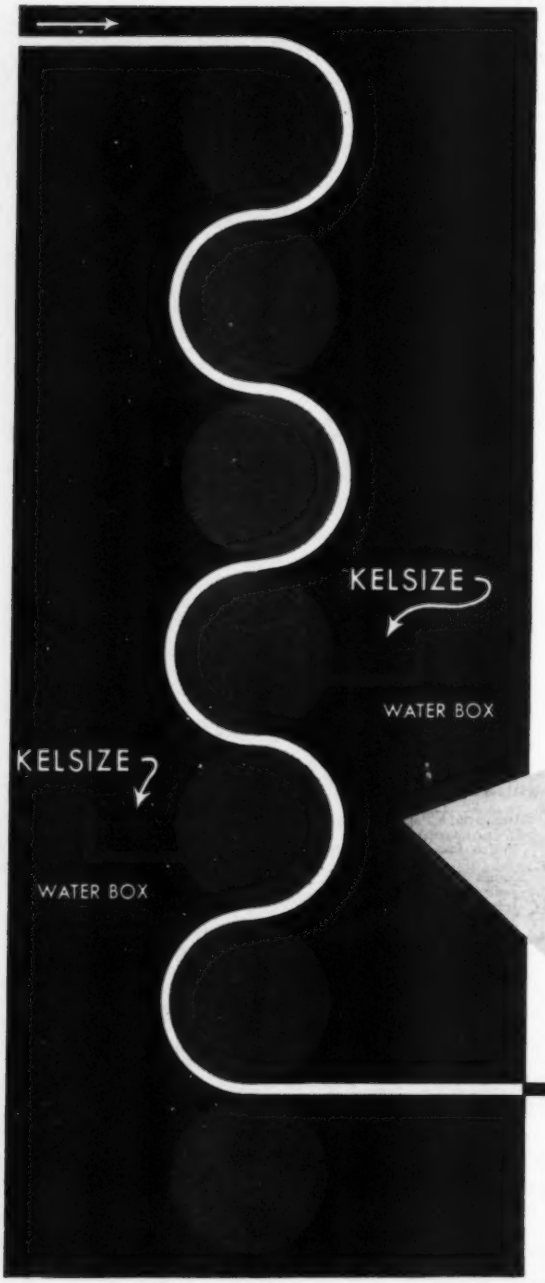

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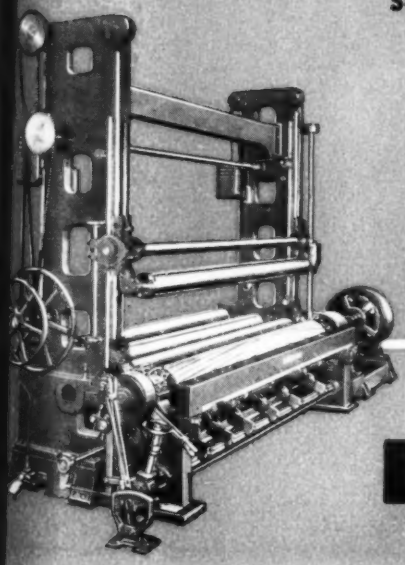

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